N-TRON
THE INDUSTRIAL NETWORK COMPANY

CIP

User Manual & Installation Guide

N-TRON CIP Manual

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1 Introduction

EtherNet/IP™, better known as the Common Industrial Protocol (CIP™), was designed for use in process control and industrial automation applications. CIP was designed to provide consistent device access to eliminate the need for vendor specific software for configuration and monitoring of individual devices.

N-TRON switches with CIP support can be used to communicate with other industrial devices, such as Rockwell controllers.

2 CIP Components

The following CIP components are available with N-TRON CIP enabled switches.

2.1 Electronic Data Sheet (EDS)

An electronic datasheet for each N-TRON switch is provided.

In a Rockwell environment EDS files are installed using the "EDS Hardware Installation Tool". This allows N-TRON switches to be recognized in an RSLinx environment.

2.2 CIP Objects

"Objects" are used to organize various information about the switch. There are four types of objects provided. Three are specified by the ODVA, and one is N-TRON specific:

- Identity object
- TCP/IP Interface object
- Ethernet Link object
- N-TRON switch object

Standard "services" are associated with objects. Services exist for reading an attribute, setting an attribute, resetting a device, etc. See references [1] and [2] for specific details.

The following sections describe the attributes associated with each object type, such as attribute Id number and data format. All attributes can be read, but only some can be set, as shown by the "Set" column.

Identity Object

The identity object class (Class code = 0x01) and instance attributes are implemented as defined by CIP Vol 1, 5-2 [1]. There is one instance (1) of this object. Service code (0x32) will get all attributes, including optional attributes. The following table summarizes the attributes in the Identity object.

Id	Name	Set	Format	Description
1	Vendor ID		UINT (16)	1006. This is N-TRON's ODVA EtherNet/IP Vendor ID.
2	Device Type		UINT (16)	0x0C. Communications Adapter
3	Product Code		UINT (16)	Switch product code: 708TX = 701 708FX2 = 703 716TX = 705 716FX2 = 706 7018TX = 708 7018FX2 = 709 708M12 = 710 711FX3 = 711 7010TX = 713 709FX = 714 710FX2 = 715 714FX6 = 717 712FX4 = 718 7012FX2 = 719 7026TX = 720 7506GX2 = 7506
4	Major Revision		USINT (8)	Major version of CIP implementation.
	Minor Revision		USINT (8)	Minor version of CIP implementation.
5	Status		WORD (16)	Summary status of device. Bits: Bit 0 If set, device has an owner Bit 1 reserved Bit 2 If set, device has non-default configuration Bit 3 reserved Bits 4-7 Extended device status – not used Bit 8 Minor recoverable fault Bit 9 Minor unrecoverable fault Bit 10 Major recoverable fault Bit 11 Major unrecoverable fault Bits 12-15 reserved (see fault table below)
6	Serial Number		UDINT (32)	Serial number of the device. This is the last 4 octets of the base switch MAC.
7	Product Name		SHORT_STRING	Switch Model Number. EX: N-TRON 7018FX2
15	Assigned_Name	Set	STRINGI	This is the user assigned switch name.

17	Geographic_Location	Set	STRINGI	This is the user assigned switch location.

The table below defines fault bits within the Status attribute of the Identity object.

Bit	Called	Definition
8	Minor Recoverable Fault	Power supply 1, Power supply 2, N-Ring Full, System, Port utilization, Temperature, N-Link partner is down, N-Link integrity fault
9	Minor Unrecoverable Fault	Configuration device error
10	Major Recoverable Fault	N-Ring partial low, N-Ring partial high, N-Ring multiple managers, Boot loader version, N-Link partner port unknown, N-Link multiple masters, N-Link control fault, N-Link configuration fault
11	Major Unrecoverable Fault	none

2.2.1 TCP/IP Interface Object

The TCP/IP Interface object class (Class code = 0xF5) and instance attributes are implemented as defined by CIP Vol 2, 5-3 [2]. There is only one instance (1) of this object. The following table summarizes the attributes in the TCP/IP Interface object.

Id	Name	Set	Format	Description
1	Status		DWORD (32)	Interface status 0 interface configuration attrib not configured 1 interface configuration attrib is valid
2	Configuration Capability		DWORD (32)	Interface capability flags. Bits: 0 BOOTP client capable 1 DNS client capable 2 DHCP client capable 3 DHCP-DNS update capable 4 Configuration is settable 5 Through bit 31 reserved
3	Configuration Control	Set	DWORD (32)	Interface control flags. Bits 0-3: 0 use interface configuration previously stored 1 get interface configuration via BOOTP 2 get interface configuration via DHCP 3 through 15 reserved Bit 4=1 device shall resolve host names by querying a DNS server
4	Physical Link Object		STRUCT of:	
	Path Size		UINT (16)	Size of Path
	Path		Padded EPATH	Logical segments identifying the physical link object
5	Interface Configuration		STRUCT of:	
	IP Address	Set	UDINT (32)	The device's IP address.
	Network Mask	Set	UDINT (32)	The device's network mask
	Gateway Address	Set	UDINT (32)	Default gateway address
	Name Server	Set	UDINT (32)	Primary name server
	Name Server 2	Set	UDINT (32)	Secondary name server
	Domain Name	Set	STRING	Default domain name
6	Host Name		STRING	Host name

2.2.2 Ethernet Link Object

The Ethernet Link object class (Class code = 0xF6) and instance attributes are implemented as defined by CIP Vol 2, 5-4 [2]. There is one instance of this object per switch port where instance 1 = port 1, instance 2 = port 2, etc. As per the CIP specification, the get all service code (0x01) will get all attributes, excluding vendor extensions. Service code (0x32) will get all attributes, including the N-TRON vendor extensions. The following table summarizes the attributes in the Ethernet Link object.

Id	Name	Set	Format	Description
1	Interface Speed		UDINT (32)	Interface speed currently in use. Speed in Mbps (e.g., 0, 10, 100, 1000, etc.)
2	Interface Flags		DWORD (32)	Interface status flags Bit map of interface flags. See section 5-4.3.2.1. Includes Link status, duplex mode, auto-negotiation status, etc.
3	Physical Address		ARRAY of 6 USINTs (8)	MAC address of switch port. Base MAC plus port number.
4	Interface Counters		STRUCT of:	
	In Octets		UDINT (32)	Octets received on the interface.
	In Ucast Packets		UDINT (32)	Unicast packets received on the interface.
	In Nucast Packets		UDINT (32)	Non-unicast packets received on the interface.
	In Discards		UDINT (32)	Inbound packets received on the interface but discarded
	In Errors		UDINT (32)	= 0. Not available. Inbound packets that contain errors (does not include In Discards).
	In Unknown Protos		UDINT (32)	= 0. Not available. Inbound packets with unknown protocol
	Out Octets		UDINT (32)	Octets sent on the interface
	Out Ucast Packets		UDINT (32)	Unicast packets sent on the interface
	Out Nucast Packets		UDINT (32)	Non-unicast packets sent on the interface
	Out Discards		UDINT (32)	Outbound packets discarded
	Out Errors		UDINT (32)	= 0. Not available. Outbound packets that contain errors
5	Media Counters		STRUCT of:	
	Alignment Errors		UDINT (32)	Frames received that are not an integral number of octets in length
	FCS Errors		UDINT (32)	Frames received that do not pass the FCS check
	Single Collisions		UDINT (32)	Successfully transmitted frames which experienced exactly one collision
	Multiple Collisions		UDINT (32)	Successfully transmitted frames which experienced more than one collision
	SQE Test Errors		UDINT (32)	= 0. Not available. Number of times SQE test error message is generated
	Deferred Transmissions		UDINT (32)	Frames for which first transmission attempt is delayed because the medium is busy
	Late Collisions		UDINT (32)	Number of times a collision is detected later than 512 bit times into the transmission of a packet
	Excessive Collisions		UDINT (32)	Frames for which transmission fails due to excessive collisions

	MAC Transmit Errors		UDINT (32)	= 0. Not available. Frames for which transmission fails due to an internal MAC sub layer transmit error
	Carrier Sense Errors		UDINT (32)	= 0. Not available. Times that the carrier sense condition was lost or never asserted when attempting to transmit a frame
	Frame Too Long		UDINT (32)	Frames received that exceed the maximum permitted frame size
	MAC Receive Errors		UDINT (32)	= 0. Not available. Frames for which reception on an interface fails due to an internal MAC sub layer receive error
6	Interface Control		STRUCT of:	
	Control Bits	Set	WORD (16)	Interface Control Bits. Includes auto-negotiation and duplex settings.
	Forced Interface Speed	Set	UINT (16)	Speed at which the interface shall be forced to operate. Speed in Mbps (10, 100, 1000, etc.)
7	Interface Type		USINT (8)	Type of interface: twisted pair, fiber, internal, etc
8	Interface State		USINT (8)	Current state of the interface: operational, disabled, etc
9	Admin State	Set	USINT (8)	Administrative state: enable, disable
10	Interface Label		SHORT_STRING	Human readable identification: TX1, FX1, GB1, etc.
100	Interface Description		SHORT_STRING	Human readable description. For example: Port 1 - 10/100 Mbit TX Port 15 - 100 MBit FX
101	Interface Utilization		USINT (8)	Percentage of entire interface bandwidth being used (0-100).
102	Utilization Alarm Upper Threshold	Set	USINT (8)	Upper percentage at which to declare a utilization alarm (0-100).
103	Utilization Alarm Lower Threshold	Set	USINT (8)	Lower percentage at which to declare a utilization alarm (0-100).
104	Broadcast Limit	Set	USINT (8)	Broadcast limiting percentage (0-100). (BPCL)
105	TX Unicast Packet Rate		UDINT32	Number of TX unicast packets per second.
106	RX Unicast Packet Rate		UDINT32	Number of RX unicast packets per second.
107	TX Multicast Packet Rate		UDINT32	Number of TX multicast packets per second
108	RX Multicast Packet Rate		UDINT32	Number of RX multicast packets per second
109	TX Broadcast Packet Rate		UDINT32	Number of TX broadcast packets per second.
110	RX Broadcast Packet Rate		UDINT32	Number of RX broadcast packets per second.
111	TX Multicast Packets		UDINT32	Total number of TX multicast packets.
112	RX Multicast Packets		UDINT32	Total number of RX multicast packets.
113	TX Broadcast Packets		UDINT32	Total number of TX broadcast packets.
114	RX Broadcast Packets		UDINT32	Total number of RX broadcast packets.
115	Port Role		UDINT32	Bit mask of port roles. Bits= 0 = RSTP 1 = N-Ring 2 = N-Link Control 3 = N-Link Partner 4 = N-Link Coupler

2.2.3 N-TRON Object

The N-TRON object (Class code = 0xC0) is a vendor specific object and is implemented as defined by CIP Vol 1, 4 [1]. There is only one instance (1) of this object. The following table summarizes the attributes of the N-TRON object.

Id	Name	Set	Format	Description
1	Device Up Time		UDINT (32)	Number of seconds since device was powered up.
2	Port Count		UDINT (32)	Total port count
3	Valid Ports		LWORD (64) AB: DINT[2]	0 = Invalid Port, 1 = Port Exists on device Bit 0: Port 1 Bit 1: Port 2 etc.
4	Global Admin Status		LWORD (64) AB: DINT[2]	0 = Port Disabled, 1 = Port Enabled Bit 0: Port 1 Bit 1: Port 2 etc.
5	Global Link Status		LWORD (64) AB: DINT[2]	0 = Link Down, 1 = Link Up Bit 0: Port 1 Bit 1: Port 2 etc.
6	System Faults		DWORD (32)	Bit 00: Power Supply 1 Bit 01: Power Supply 2 Bit 02: N-Ring Fault (complete) Bit 03: N-Ring Partial Fault (low port) Bit 04: N-Ring Partial Fault (high port) Bit 05: N-Ring Multiple Managers Bit 06: System error Bit 07: Dongle Configuration Invalid Bit 08: N-Link Fault Bit 09: Boot loader version mismatch Bit 10: Port Utilization Alarm Bit 11: Temperature Alarm
7	IGMP Querier Status		USINT (8)	Query Status: 0 = Disabled, 1 = Active (manual), 2 = Active (Auto), 3 = Backup (Auto) [enabled but not active].
8	IGMP Version		USINT (8)	IGMP Version (V1, V2, V3, etc).
9	IGMP Resource Usage		USINT (8)	Percent of maximum capacity. Takes into account the number of groups used per max groups and any other possible resource limitations (0-100).
10	IGMP Active Querier		UDINT (32)	IP of the active IGMP querier.
11	CPU Usage		USINT (8)	Percent of usage (0-100).
12	Class 1 Connections		UINT (16)	Number of CIP Ethernet/IP class 1 (multicast) connections.
13	Class 3 Connections		UINT (16)	Number of CIP Ethernet/IP class 3 (unicast) connections.

14	Temperature Alarm Upper Threshold	Set	INT (16)	Upper temperature (C) at which to declare an alarm
15	Temperature Alarm Lower Threshold	Set	INT (16)	Lower temperature (C) at which to declare an alarm
16	Contact Status		BYTE (8)	2 Bits per contact. 00=Not Present, 01=Open, 10=Closed.
17	Temperature_C		INT (16)	Temperature in degrees C. 0x7FFF = Not Supported on device.
18	Temperature_F		INT (16)	Temperature in degrees F. 0x7FFF = Not Supported on device.
19	Reset MIB Counts	Set	LWORD (64)	Reset port MIB counters. (1 bit per port to reset).
20	Device MAC Address		ARRAY of 6 USINTs (8)	MAC address of device
21	Device Role		UDINT (32)	Bit mask of device roles. Bits= 0 = N-Ring Manager 1 = N-Ring Member 2 = N-Ring AutoDetect 3 = N-Link Master 4 = N-Link Slave 5 = N-Link Coupler
22	Config Device Status		BYTE (8)	0 = Not Supported, 1 = Not Present, 2 = Present
23	System Configuration	Set	UDINT32	Bit mask of system config. Bits= Bit 0: GET: Changes have been made that have not been saved. SET: Save system configuration to flash. Bit 1: GET: Changes have been made that require a reboot to take affect. SET: Shutdown and reboot device
24	System Firmware Version String		SHORT_STRING	Human readable representation of firmware version string.
25	System Boot Loader Version String		SHORT_STRING	Human readable representation of boot loader version string.
26	System Fault String		STRINGI	Human readable representation of error status. May contain multiple errors. Length is contained as part of the STRINGI data type.

2.3 CIP Services

The table following is a summary of the supported services as defined by CIP Vol 1, Appendix A: Explicit Messaging Services [1].

Service Code	Service Description	Identity	TCP/IP	Ethernet Link	N-TRON
1	Get_Attributes_All	yes	yes	yes	yes
5	Reset	Yes – reset switch or restore factory configuration			
14	Get_Attribute_Single	yes	yes	yes	yes
16	Set_Attribute_Single	Attributes 15,17	Attributes 3,5	Attributes 6,9, 102-104	Attributes 14,15,19,23
Vendor Specific					
50	Get_All_Attributes – including vendor defined attributes	yes		yes	
Object Specific					
76	Get_And_Clear			Attributes 4,5	

2.4 Accessing Data

2.4.1 Explicit Messaging

Explicit messaging refers to a request/response form of communications over a CIP (TCP/IP) connection. Applications can use explicit messaging, for example, to invoke the "Get All Attributes" service and read all attributes of the Identity object.

2.4.2 I/O Connections

I/O connections are used to send data (grouped in assemblies) between devices periodically. The interval between sends is the "Requested Packet Interval", or RPI.

The N-TRON switch assemblies (Input, Output, and Configuration) are defined in the following table.

N-TRON switch	Assembly Number	Size (bytes)
Input (to switch)*	101	4
Output (from switch)	102	104
Configuration*	103	0

* - not currently used

In an RSLogix 5000 environment, these assemblies are configured in the "Connection Parameters" panel of the Generic Ethernet Module. (Note that input and output assemblies are reversed.) More information is contained in the section for Add-On Instruction installation.

3 Rockwell RSLogix 5000 – Add-On Instruction Installation

N-TRON 700-Series Switch
RSLogix Add-On Instructions (AOI)

Installation Instructions

Software installation prerequisites

1. RSLogix 5000 version 17 or later
2. N-TRON switch with firmware version 3 or later

Summary of steps

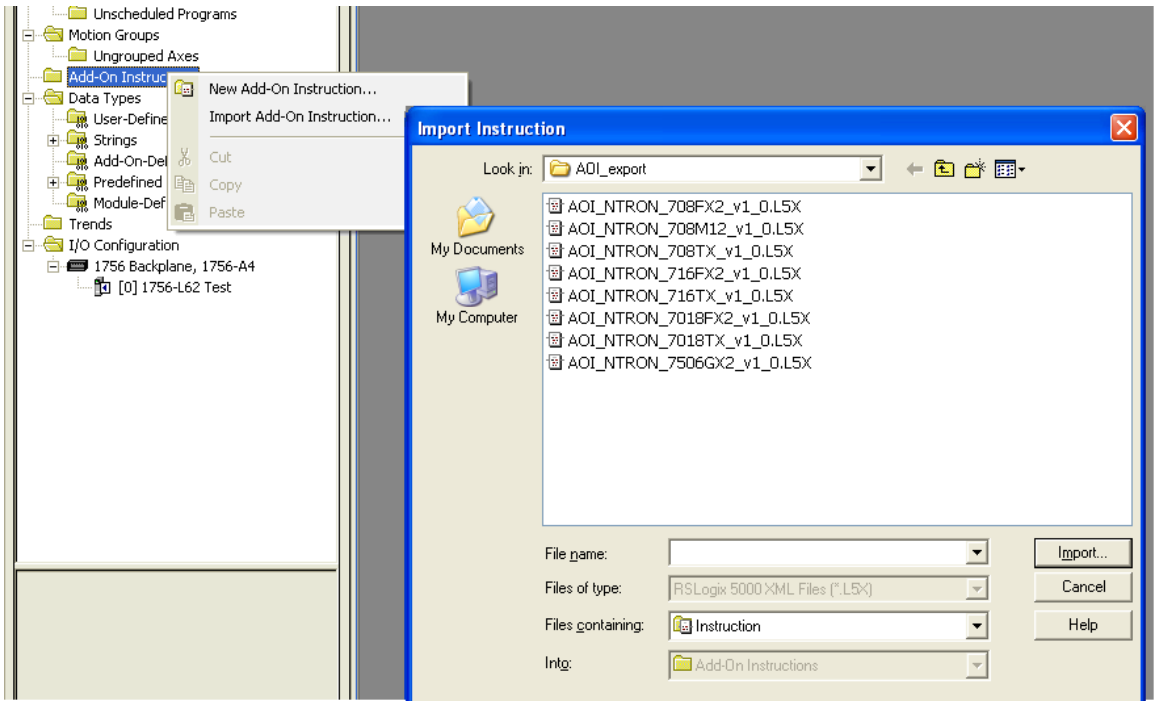
1. Import the Add-On Instruction (AOI)
2. Add your N-TRON switch to the I/O Configuration tree
3. Add an instance of the AOI in your application
4. Create and configure tags for the AOI

3.1 Configuration of RSLogix project

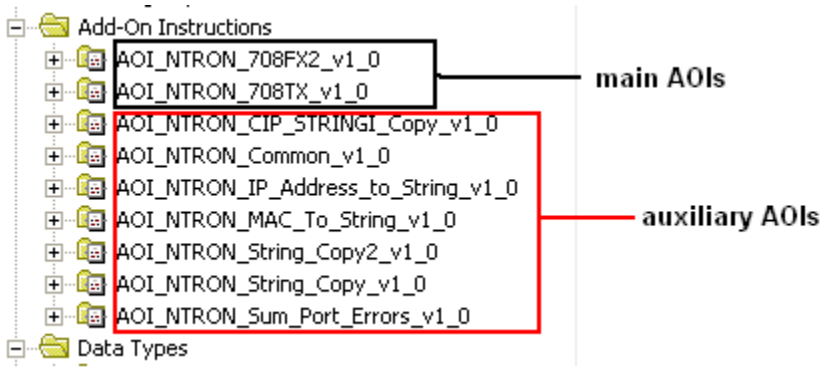
Extract all files from the zip file to your desktop or destination folder.

Open an RSLogix project.

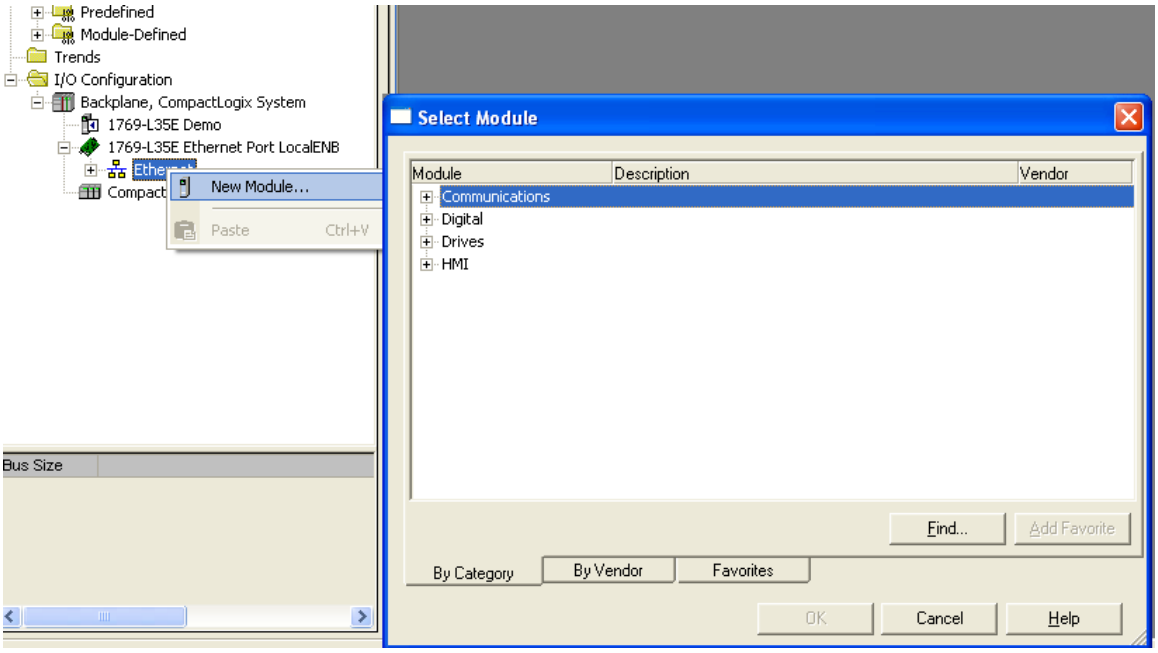
Import the N-TRON Add-On Instruction (AOI). In the controller organizer window, right click "Add-On Instructions" folder, select "Import Add-On Instruction" and browse to the folder containing AOI_NTRON_*.L5X files. Import an AOI for each switch type installed.



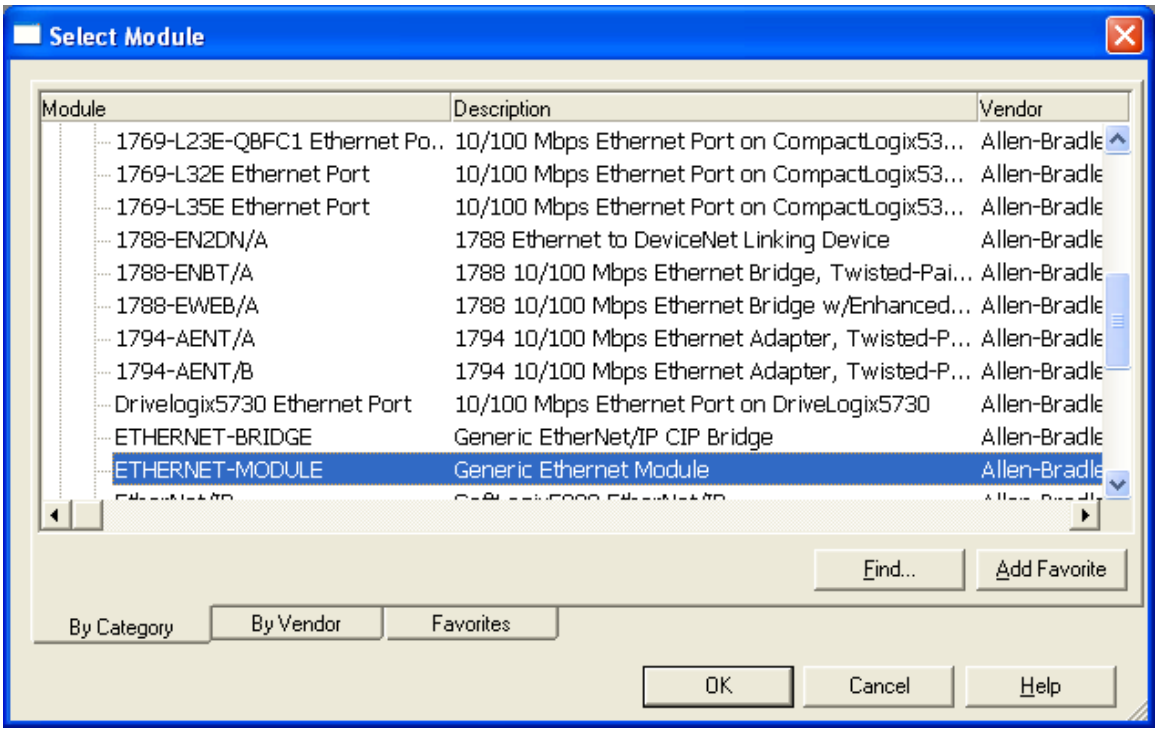
The Add-On Instruction tree showing AOIs for 708FX2, 708TX, and several auxiliary AOIs.



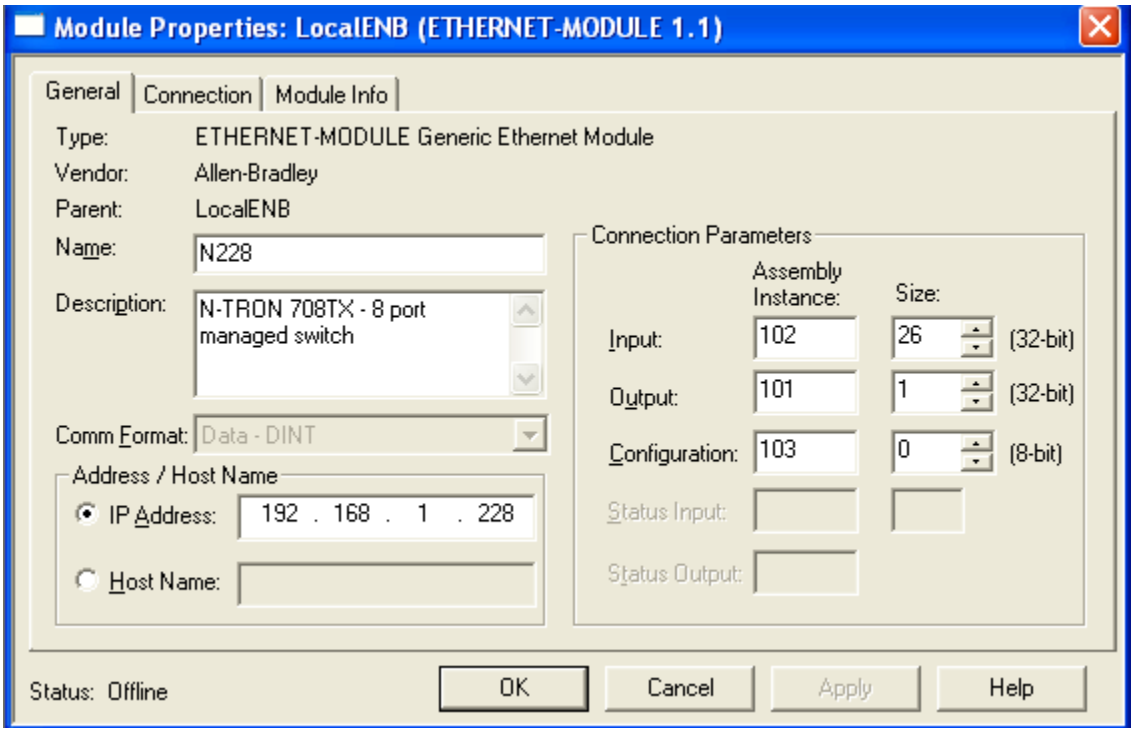
Add a Generic Ethernet Module to the I/O Configuration.



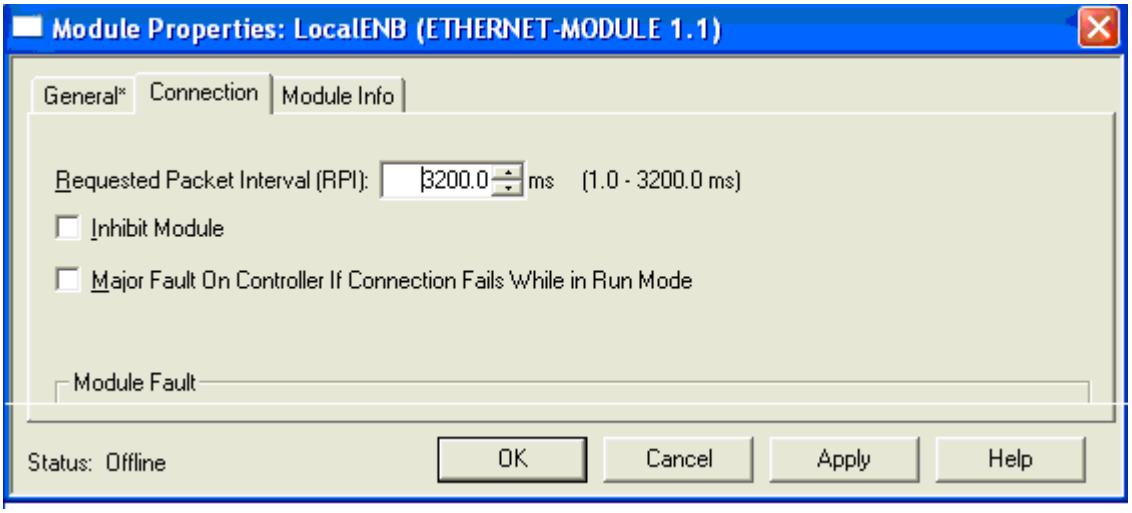
The Generic Ethernet Module is located under the “Communications” group:



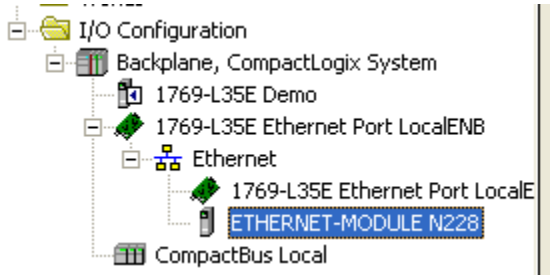
Configure the module as shown. Use the proper IP address and connection parameters for your installation.



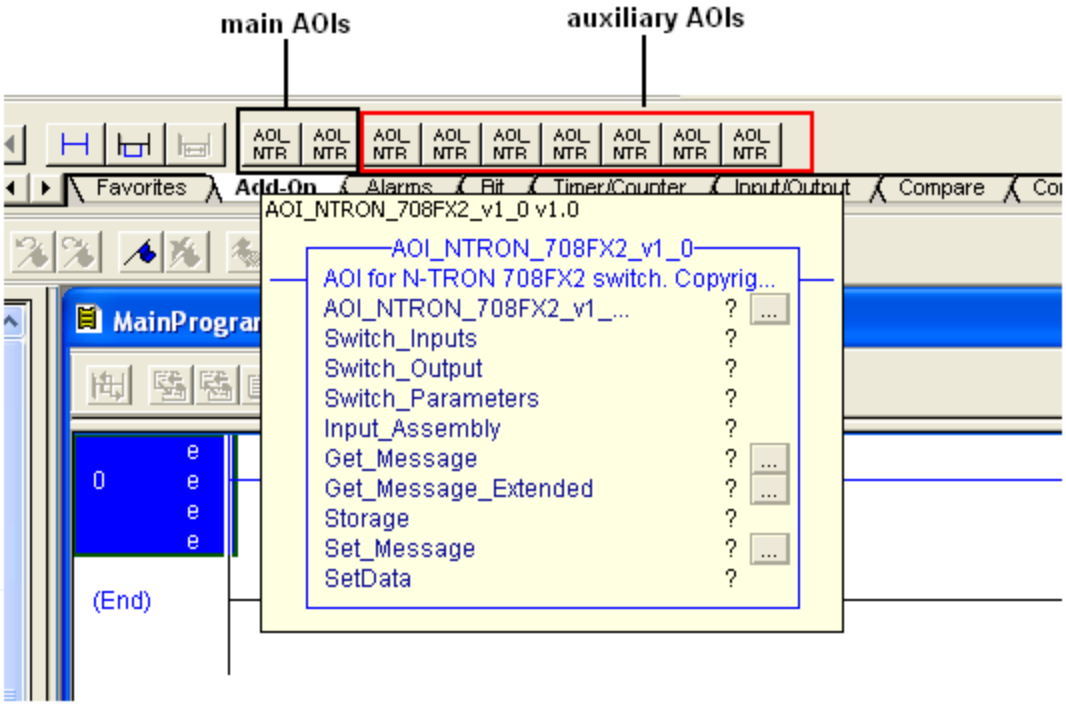
Click the Connection tab and set the desired RPI. The input assembly will be received from the switch at the selected RPI.



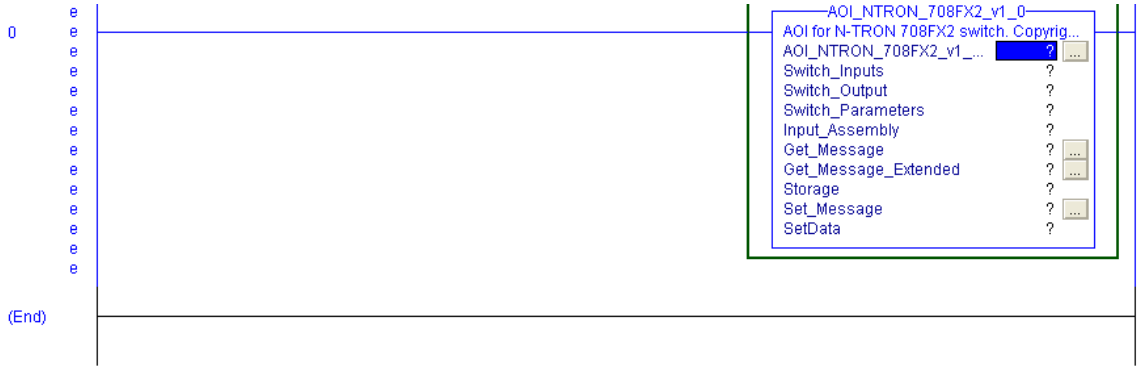
Click OK The new module will appear in the I/O Configuration tree:



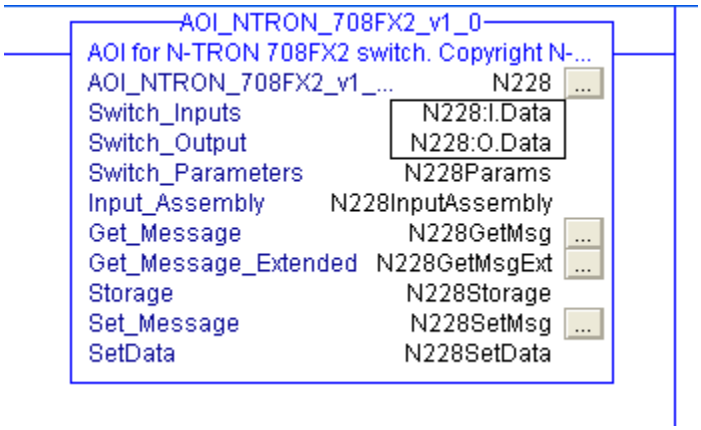
Create a new rung in the MainRoutine and add the AOI for your specific switch to the rung.



The following will appear:

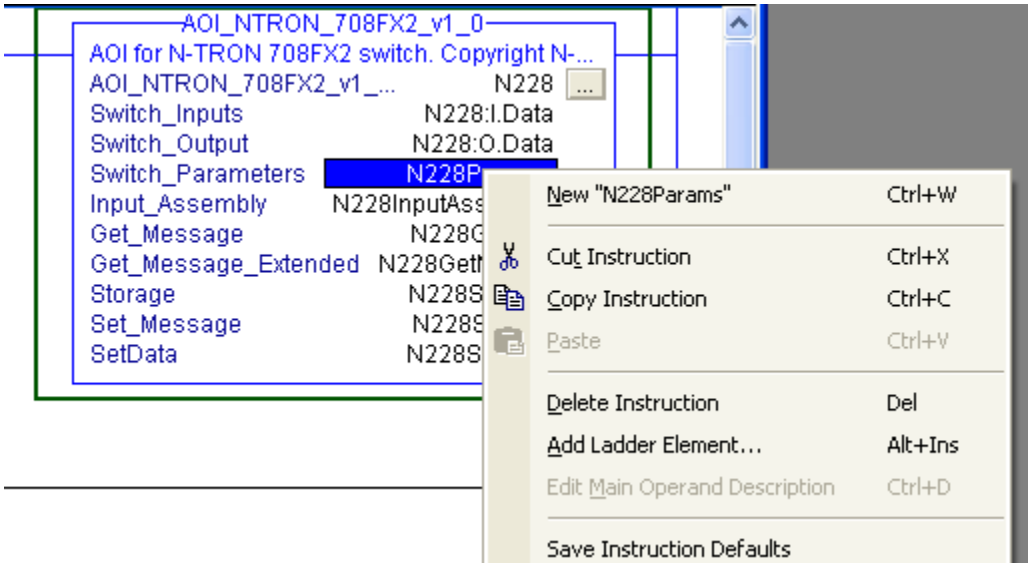


Add tag names for the various fields. For example:

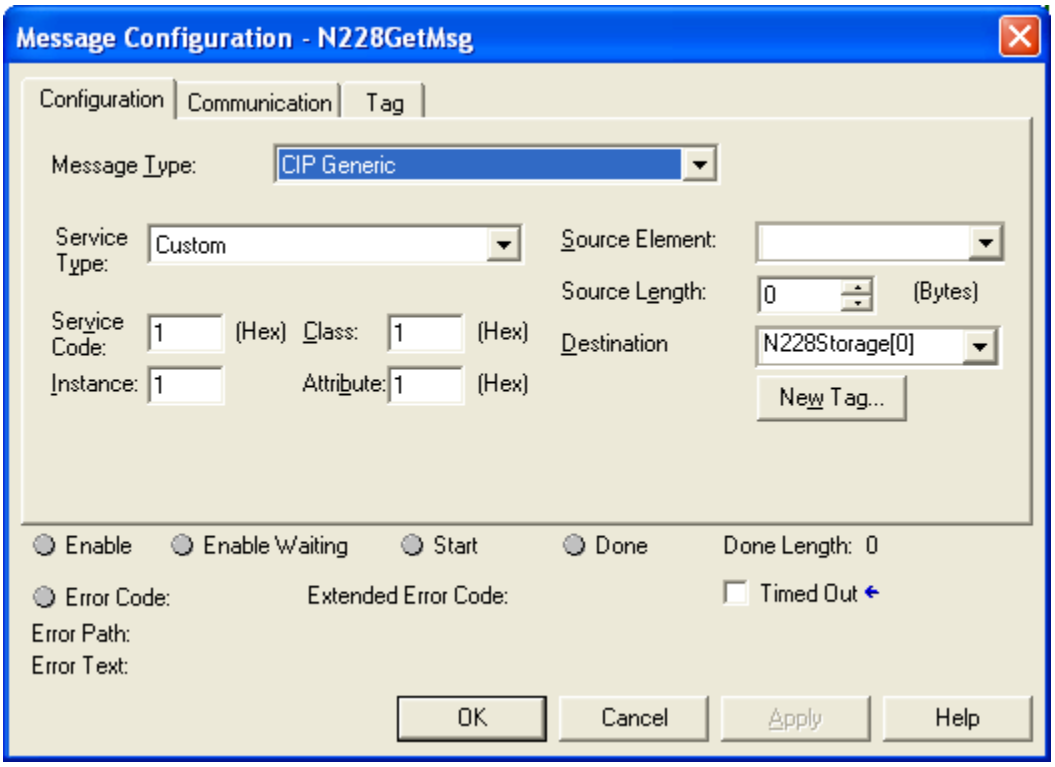


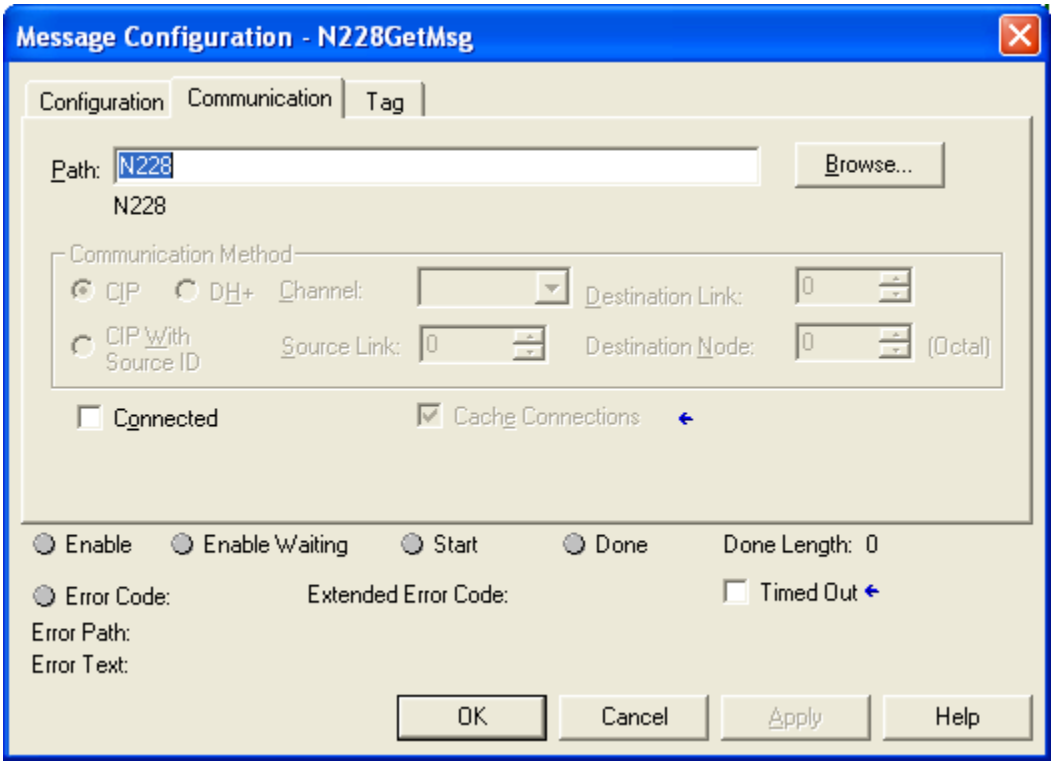
Right click on each new tag name and create each tag. (Note that the tags for Switch_Inputs and Switch_Outputs, shown in the rectangle above, were created when the Generic Ethernet Module was added.)

For example:

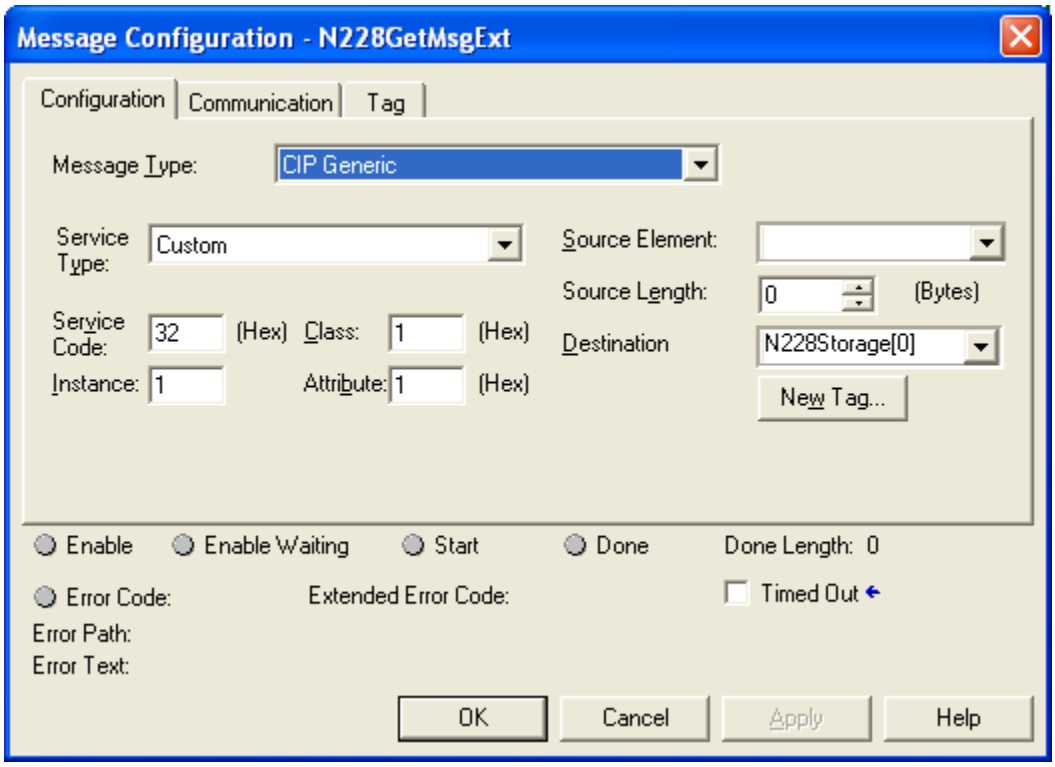


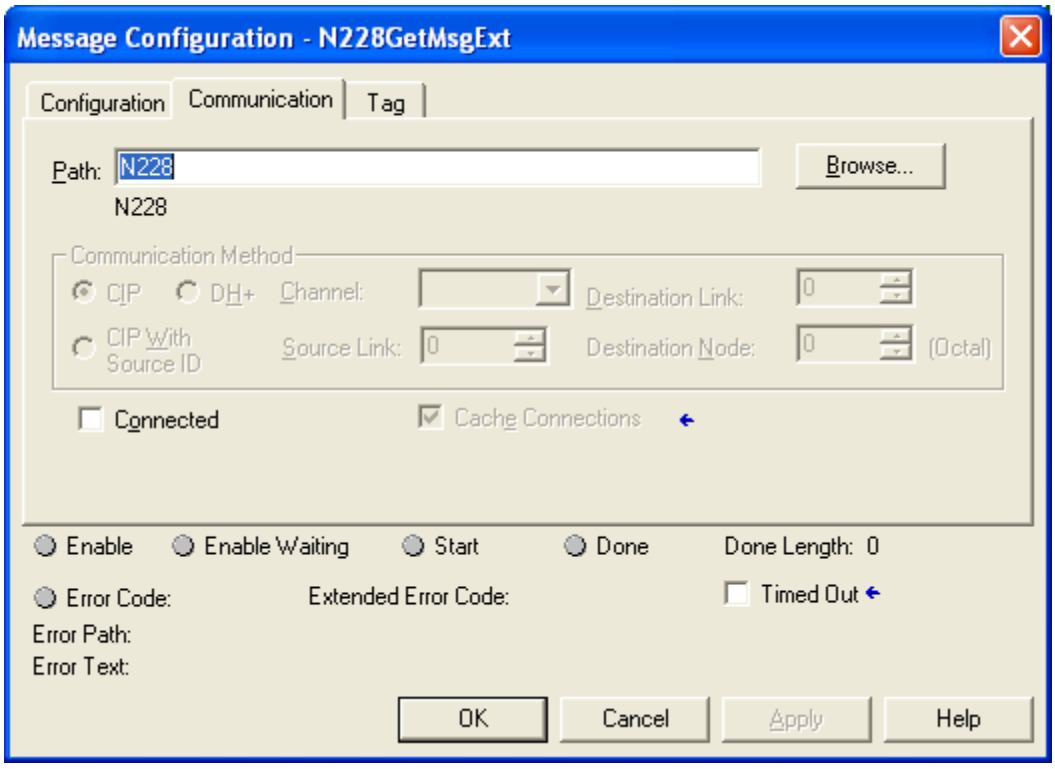
Click the button to the right of the “Get_Message” tag and configure as shown:


Message Configuration - N228GetMsg
Configuration
Communication
Tag
Message Type:
CIP Generic
Service Type:
Custom
Service Code:
1
(Hex)
Class:
1
(Hex)
Instance:
1
Attribute:
1
(Hex)
Source Element:
Source Length:
0
(Bytes)
Destination
N228Storage[0]
New Tag...
Enable
Enable Waiting
Start
Done
Done Length: 0
Error Code:
Extended Error Code:
Timed Out
Error Path:
Error Text:
OK
Cancel
Apply
Help

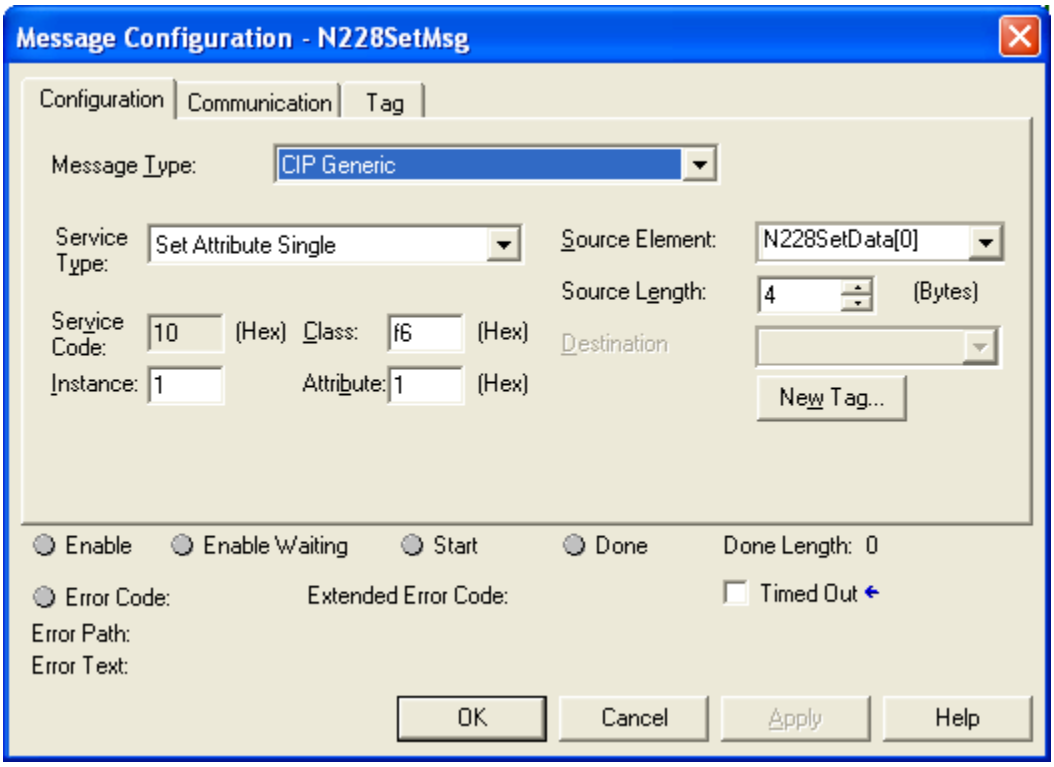

Message Configuration - N228GetMsg
Configuration
Communication
Tag
Path:
N228
N228
Browse...
Communication Method
CIP
DH+
Channel:
Destination Link:
0
CIP With Source ID
Source Link:
0
Destination Node:
0
(Octal)
Connected
Cache Connections
Enable
Enable Waiting
Start
Done
Done Length: 0
Error Code:
Extended Error Code:
Timed Out
Error Path:
Error Text:
OK
Cancel
Apply
Help

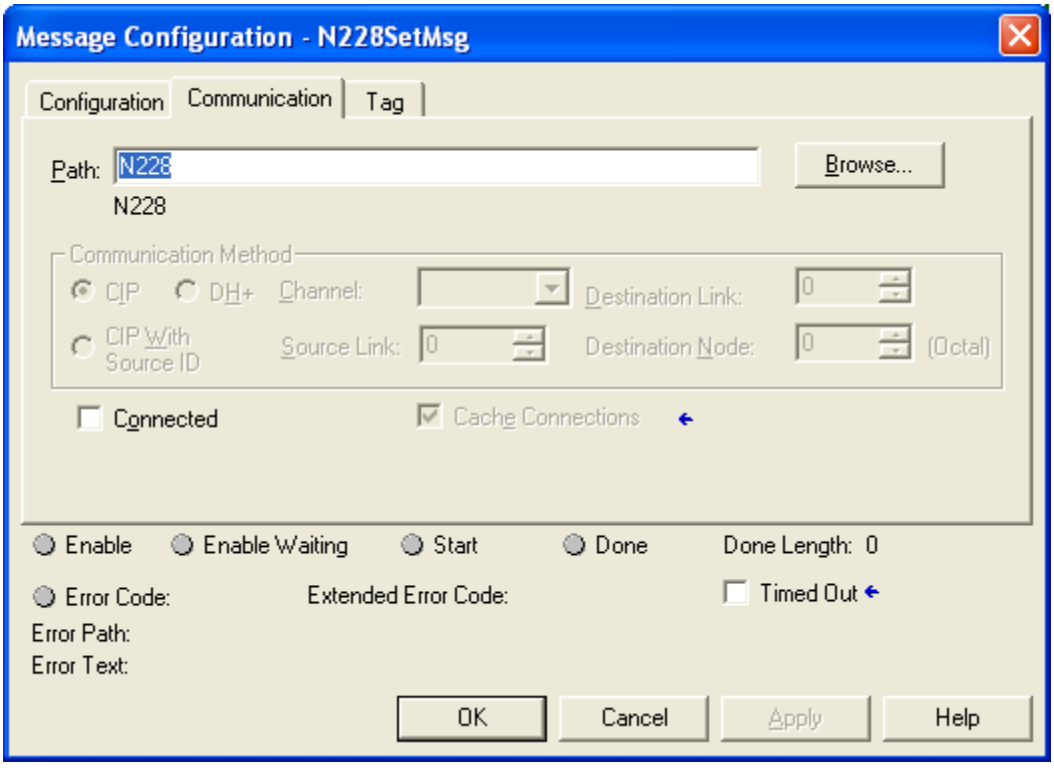
Click the button to the right of the “Get_Message_Extended” tag and configure as shown:





Click the button to the right of the “Set_Message” tag and configure as shown:

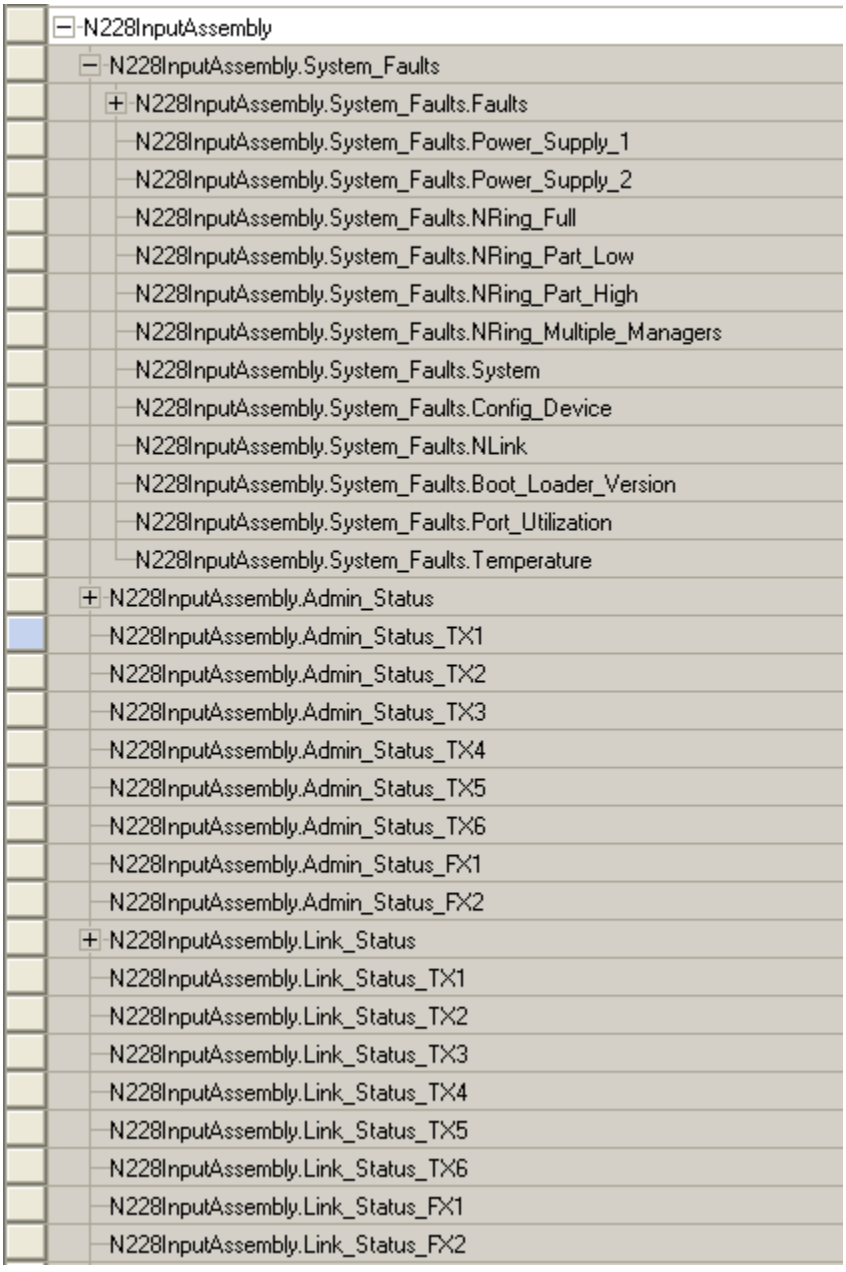




Verify your changes by clicking Logic > Verify > Controller. If there are no warnings or errors, the RSLogix configuration is complete.

3.2 Input_Assembly Parameter

Some data comes from the switch at the RPI (requested packet interval) set for the Generic Ethernet Module. The data is available in tags like these below (a mapping of the Switch_Inputs data):



These tags represent a switch specific (708FX2) view of the assembly data.

3.3 Switch_Parameters Parameter

The AOI requests additional information from the switch as needed by a faceplate display (and when started). This includes the CIP Identity object, the CIP TCP/IP object, an instance of the CIP Ethernet Link object, and the NTRON Switch object.

The RSLogix 5000 screenshot below shows a top level view of some of the AOI "Switch_Parameters" structure:

⊟ N228params	UDT_NTRON_Switch_Common_v0	
⊞ N228params.Generic_Inputs	UDT_NTRON_Switch_In_v0	assembly received from switch
⊞ N228params.Output	DINT	assembly sent to switch
⊞ N228params.Identity	UDT_NTRON_CIP_Identity_v0	N-TRON CIP Identity Object
⊞ N228params.TCPIP	UDT_NTRON_CIP_TCPIP_Interface_v0	N-TRON CIP TCP/IP Interface Object
⊞ N228params.Switch	UDT_NTRON_CIP_Switch_v0	N-TRON CIP Custom Object
⊞ N228params.Ethernet_Link	UDT_NTRON_CIP_Ethernet_Link_v0[64]	N-TRON CIP Ethernet Link Object
⊞ N228params.Data	UDT_NTRON_CIP_DATA_v0	Related to HMI data and control
⊞ N228params.Control	UDT_NTRON_CIP_Control_v0	Created to control explicit CIP messaging

N228Params.Generic_Inputs is a generic view of the assembly data from a switch.

3.4 Explicit Messaging Options

To direct the AOI to gather this information (via explicit messaging) for other purposes (example: not using faceplates), use the following members of the N228Params.Control tag:

Name	Data Type	Description
Selected_Port	INT	Use this member to read Ethernet Link object for one port. To read more than one port, use Read_Port_Mask. Set by the faceplate. Port data is copied to the UDT_NTRON_CIP_DATA_v0 data type.
Request_Data	BOOL	0 - explicit messaging is disabled; 1 - explicit messaging is enabled
Read_Port_Mask	DINT	Set bit n to read ethernet link object for port n+1
Explicit_Messaging_Timer_Reset	DINT	Used to control time between each MSG call to read CIP Identity object, TCPIP object, N-TRON object, and selected Ethernet Link objects. Minimum is 200 ms. Default is 1000 ms.

Sample ladder logic rungs are available that show how to control explicit messaging.

3.5 Troubleshooting

Module Fault (Code 16#0315 Connection Request Error: Invalid segment type.

This error occurs when the assembly information specified for the Generic Ethernet Module does not match the assembly information on the N-TRON switch.

3.6 Sample Project

A sample project is included in the CIP_Installation_Kit_1_5_0.zip file. It is named NTRON_Demo.ACD.

To use the sample project, you may need to change the controller type used in your environment, and you will need to setup the Project path.

If you have any suggestions for improving the AOI or the installation instructions, please send them to N-TRON_Support@n-tron.com with subject “RSLogix5000 AOI”.

4 Rockwell RSLogix 5000 – Tag reference

The assembly data received from an N-TRON switch can be viewed with generic tags or switch specific tags. Generic tags are defined by the data type UDT_NTRON_Switch_In_v0. Switch specific tags are defined by a switch specific data type.

Switch	Data Type
7018FX2	UDT_NTRON_Switch_7018FX2_In_v0
7018TX	UDT_NTRON_Switch_7018TX_In_v0
708FX2	UDT_NTRON_Switch_708FX2_In_v0
708M12	UDT_NTRON_Switch_708M12_In_v0
708TX	UDT_NTRON_Switch_708TX_In_v0
716FX2	UDT_NTRON_Switch_716FX2_In_v0
716TX	UDT_NTRON_Switch_716TX_In_v0
7506GX2	UDT_NTRON_Switch_7506GX2_In_v0
711FX3	UDT_NTRON_Switch_711FX3_In_v0
7010TX	UDT_NTRON_Switch_7010TX_In_v0
709FX	UDT_NTRON_Switch_709FX_In_v0
710FX2	UDT_NTRON_Switch_710FX2_In_v0
714FX6	UDT_NTRON_Switch_714FX6_In_v0
712FX4	UDT_NTRON_Switch_712FX4_In_v0
7012FX2	UDT_NTRON_Switch_7012FX2_In_v0
7026TX	UDT_NTRON_Switch_7026TX_In_v0

Here are some of the tag descriptions:

4.1 Generic assembly tags

Data Type: UDT_NTRON_Switch_In_v0

Generic view of assembly data received from an N-TRON Switch.

Name	Data Type	Description
System_Faults	UDT_NTRON_System_Faults_v0	Status of various system faults.
Admin_Status	DINT	Admin_Status of first 32 ports. Also available as port specific tags.
Admin_Status_1	BOOL	1=enabled, 0=disabled
Admin_Status_2	BOOL	
Admin_Status_3	BOOL	
Admin_Status_4	BOOL	

Admin_Status_5	BOOL	
Admin_Status_6	BOOL	
Admin_Status_7	BOOL	
Admin_Status_8	BOOL	
Admin_Status_9	BOOL	
Admin_Status_10	BOOL	
Admin_Status_11	BOOL	
Admin_Status_12	BOOL	
Admin_Status_13	BOOL	
Admin_Status_14	BOOL	
Admin_Status_15	BOOL	
Admin_Status_16	BOOL	
Admin_Status_17	BOOL	
Admin_Status_18	BOOL	
Admin_Status_19	BOOL	
Admin_Status_20	BOOL	
Admin_Status_21	BOOL	
Admin_Status_22	BOOL	
Admin_Status_23	BOOL	
Admin_Status_24	BOOL	
Admin_Status_25	BOOL	
Admin_Status_26	BOOL	
Admin_Status_27	BOOL	
Admin_Status_28	BOOL	
Admin_Status_29	BOOL	
Admin_Status_30	BOOL	
Admin_Status_31	BOOL	
Admin_Status_32	BOOL	
Admin_Status2	DINT	Admin_Status of second 32 ports. Also available as port specific tags.
Admin_Status_33	BOOL	

Admin_Status_34	BOOL	
Admin_Status_35	BOOL	
Admin_Status_36	BOOL	
Admin_Status_37	BOOL	
Admin_Status_38	BOOL	
Admin_Status_39	BOOL	
Admin_Status_40	BOOL	
Admin_Status_41	BOOL	
Admin_Status_42	BOOL	
Admin_Status_43	BOOL	
Admin_Status_44	BOOL	
Admin_Status_45	BOOL	
Admin_Status_46	BOOL	
Admin_Status_47	BOOL	
Admin_Status_48	BOOL	
Admin_Status_49	BOOL	
Admin_Status_50	BOOL	
Admin_Status_51	BOOL	
Admin_Status_52	BOOL	
Admin_Status_53	BOOL	
Admin_Status_54	BOOL	
Admin_Status_55	BOOL	
Admin_Status_56	BOOL	
Admin_Status_57	BOOL	
Admin_Status_58	BOOL	
Admin_Status_59	BOOL	
Admin_Status_60	BOOL	
Admin_Status_61	BOOL	
Admin_Status_62	BOOL	
Admin_Status_63	BOOL	
Admin_Status_64	BOOL	

Link_Status	DINT	Link_Status of first 32 ports. Also available as port specific tags.
Link_Status_1	BOOL	1=active, 0=inactive
Link_Status_2	BOOL	
Link_Status_3	BOOL	
Link_Status_4	BOOL	
Link_Status_5	BOOL	
Link_Status_6	BOOL	
Link_Status_7	BOOL	
Link_Status_8	BOOL	
Link_Status_9	BOOL	
Link_Status_10	BOOL	
Link_Status_11	BOOL	
Link_Status_12	BOOL	
Link_Status_13	BOOL	
Link_Status_14	BOOL	
Link_Status_15	BOOL	
Link_Status_16	BOOL	
Link_Status_17	BOOL	
Link_Status_18	BOOL	
Link_Status_19	BOOL	
Link_Status_20	BOOL	
Link_Status_21	BOOL	
Link_Status_22	BOOL	
Link_Status_23	BOOL	
Link_Status_24	BOOL	
Link_Status_25	BOOL	
Link_Status_26	BOOL	
Link_Status_27	BOOL	
Link_Status_28	BOOL	
Link_Status_29	BOOL	

Link_Status_30	BOOL	
Link_Status_31	BOOL	
Link_Status_32	BOOL	
Link_Status2	DINT	Link_Status of second 32 ports. Also available as port specific tags.
Link_Status_33	BOOL	
Link_Status_34	BOOL	
Link_Status_35	BOOL	
Link_Status_36	BOOL	
Link_Status_37	BOOL	
Link_Status_38	BOOL	
Link_Status_39	BOOL	
Link_Status_40	BOOL	
Link_Status_41	BOOL	
Link_Status_42	BOOL	
Link_Status_43	BOOL	
Link_Status_44	BOOL	
Link_Status_45	BOOL	
Link_Status_46	BOOL	
Link_Status_47	BOOL	
Link_Status_48	BOOL	
Link_Status_49	BOOL	
Link_Status_50	BOOL	
Link_Status_51	BOOL	
Link_Status_52	BOOL	
Link_Status_53	BOOL	
Link_Status_54	BOOL	
Link_Status_55	BOOL	
Link_Status_56	BOOL	
Link_Status_57	BOOL	
Link_Status_58	BOOL	

Link_Status_59	BOOL	
Link_Status_60	BOOL	
Link_Status_61	BOOL	
Link_Status_62	BOOL	
Link_Status_63	BOOL	
Link_Status_64	BOOL	
Utilization_Alarm	DINT	Bandwidth utilization alarms for first 32 ports. Also available as port specific tags.
Utilization_Alarm_1	BOOL	1=bandwidth utilization exceeds a high or low limit, 0=bandwidth utilization within limits
Utilization_Alarm_2	BOOL	
Utilization_Alarm_3	BOOL	
Utilization_Alarm_4	BOOL	
Utilization_Alarm_5	BOOL	
Utilization_Alarm_6	BOOL	
Utilization_Alarm_7	BOOL	
Utilization_Alarm_8	BOOL	
Utilization_Alarm_9	BOOL	
Utilization_Alarm_10	BOOL	
Utilization_Alarm_11	BOOL	
Utilization_Alarm_12	BOOL	
Utilization_Alarm_13	BOOL	
Utilization_Alarm_14	BOOL	
Utilization_Alarm_15	BOOL	
Utilization_Alarm_16	BOOL	
Utilization_Alarm_17	BOOL	
Utilization_Alarm_18	BOOL	
Utilization_Alarm_19	BOOL	
Utilization_Alarm_20	BOOL	
Utilization_Alarm_21	BOOL	
Utilization_Alarm_22	BOOL	
Utilization_Alarm_23	BOOL	

Utilization_Alarm_24	BOOL	
Utilization_Alarm_25	BOOL	
Utilization_Alarm_26	BOOL	
Utilization_Alarm_27	BOOL	
Utilization_Alarm_28	BOOL	
Utilization_Alarm_29	BOOL	
Utilization_Alarm_30	BOOL	
Utilization_Alarm_31	BOOL	
Utilization_Alarm_32	BOOL	
Utilization_Alarm2	DINT	Bandwidth utilization alarms for second 32 ports. Also available as port specific tags.
Utilization_Alarm_33	BOOL	
Utilization_Alarm_34	BOOL	
Utilization_Alarm_35	BOOL	
Utilization_Alarm_36	BOOL	
Utilization_Alarm_37	BOOL	
Utilization_Alarm_38	BOOL	
Utilization_Alarm_39	BOOL	
Utilization_Alarm_40	BOOL	
Utilization_Alarm_41	BOOL	
Utilization_Alarm_42	BOOL	
Utilization_Alarm_43	BOOL	
Utilization_Alarm_44	BOOL	
Utilization_Alarm_45	BOOL	
Utilization_Alarm_46	BOOL	
Utilization_Alarm_47	BOOL	
Utilization_Alarm_48	BOOL	
Utilization_Alarm_49	BOOL	
Utilization_Alarm_50	BOOL	
Utilization_Alarm_51	BOOL	
Utilization_Alarm_52	BOOL	

Utilization_Alarm_53	BOOL	
Utilization_Alarm_54	BOOL	
Utilization_Alarm_55	BOOL	
Utilization_Alarm_56	BOOL	
Utilization_Alarm_57	BOOL	
Utilization_Alarm_58	BOOL	
Utilization_Alarm_59	BOOL	
Utilization_Alarm_60	BOOL	
Utilization_Alarm_61	BOOL	
Utilization_Alarm_62	BOOL	
Utilization_Alarm_63	BOOL	
Utilization_Alarm_64	BOOL	
Class1_Connections	INT	Number of CIP Ethernet/IP class 1 (multicast) connections
Class3_Connections	INT	Number of CIP Ethernet/IP class 3 (unicast) connections
Temperature_C	INT	Temperature in degrees Celsius. 0x7FFF = Not supported on device.
Temperature_F	INT	Temperature in degrees Fahrenheit. 0x7FFF = Not supported on device.
CPU_Utilization	SINT	Percent of CPU usage, 0-100
Contact_Status	SINT	2 Bits per contact. 00=Not Present, 01=Open, 10=Closed.
Utilization_1	SINT	bandwidth utilization in percent
Utilization_2	SINT	
Utilization_3	SINT	
Utilization_4	SINT	
Utilization_5	SINT	
Utilization_6	SINT	
Utilization_7	SINT	
Utilization_8	SINT	
Utilization_9	SINT	
Utilization_10	SINT	
Utilization_11	SINT	

Utilization_12	SINT	
Utilization_13	SINT	
Utilization_14	SINT	
Utilization_15	SINT	
Utilization_16	SINT	
Utilization_17	SINT	
Utilization_18	SINT	
Utilization_19	SINT	
Utilization_20	SINT	
Utilization_21	SINT	
Utilization_22	SINT	
Utilization_23	SINT	
Utilization_24	SINT	
Utilization_25	SINT	
Utilization_26	SINT	
Utilization_27	SINT	
Utilization_28	SINT	
Utilization_29	SINT	
Utilization_30	SINT	
Utilization_31	SINT	
Utilization_32	SINT	
Utilization_33	SINT	
Utilization_34	SINT	
Utilization_35	SINT	
Utilization_36	SINT	
Utilization_37	SINT	
Utilization_38	SINT	
Utilization_39	SINT	
Utilization_40	SINT	
Utilization_41	SINT	
Utilization_42	SINT	

Utilization_43	SINT	
Utilization_44	SINT	
Utilization_45	SINT	
Utilization_46	SINT	
Utilization_47	SINT	
Utilization_48	SINT	
Utilization_49	SINT	
Utilization_50	SINT	
Utilization_51	SINT	
Utilization_52	SINT	
Utilization_53	SINT	
Utilization_54	SINT	
Utilization_55	SINT	
Utilization_56	SINT	
Utilization_57	SINT	
Utilization_58	SINT	
Utilization_59	SINT	
Utilization_60	SINT	
Utilization_61	SINT	
Utilization_62	SINT	
Utilization_63	SINT	
Utilization_64	SINT	
Update_Counter	INT	

4.2 7506GX2 assembly tags

Data Type: UDT_NTRON_Switch_7506GX2_In_v0

Specific view of assembly data received from an N-TRON 7506GX2 Switch.

Name	Data Type	Description
System_Faults	UDT_NTRON_System_Faults_v0	Status of various system faults.

Admin_Status	DINT	Admin_Status of first 32 ports. Also available as port specific tags.
Admin_Status_T1	BOOL	1=enabled, 0=disabled
Admin_Status_T2	BOOL	
Admin_Status_T3	BOOL	
Admin_Status_T4	BOOL	
Admin_Status_GB1	BOOL	
Admin_Status_GB2	BOOL	
Link_Status	DINT	Link_Status of first 32 ports. Also available as port specific tags.
Link_Status_T1	BOOL	1=active, 0=inactive
Link_Status_T2	BOOL	
Link_Status_T3	BOOL	
Link_Status_T4	BOOL	
Link_Status_GB1	BOOL	
Link_Status_GB2	BOOL	
Utilization_Alarm	DINT	Bandwidth utilization alarms for first 32 ports. Also available as port specific tags.
Utilization_Alarm_T1	BOOL	1=bandwidth utilization exceeds a high or low limit, 0=bandwidth utilization within limits
Utilization_Alarm_T2	BOOL	
Utilization_Alarm_T3	BOOL	
Utilization_Alarm_T4	BOOL	
Utilization_Alarm_GB1	BOOL	
Utilization_Alarm_GB2	BOOL	
Class1_Connections	INT	Number of CIP Ethernet/IP class 1 (multicast) connections
Class3_Connections	INT	Number of CIP Ethernet/IP class 3 (unicast) connections
Temperature_C	INT	Temperature in degrees Celsius. 0x7FFF = Not supported on device.
Temperature_F	INT	Temperature in degrees Fahrenheit. 0x7FFF = Not supported on device.
CPU_Utilization	SINT	Percent of CPU usage, 0-100
Contact_Status	SINT	2 Bits per contact. 00=Not Present, 01=Open, 10=Closed.

Utilization_T1	SINT	bandwidth utilization in percent
Utilization_T2	SINT	
Utilization_T3	SINT	
Utilization_T4	SINT	
Utilization_GB1	SINT	
Utilization_GB2	SINT	

4.3 System fault tags

Name	Data Type	Description
Faults	DINT	
Power_Supply_1	BOOL	1=Indicates a low voltage on power supply V1
Power_Supply_2	BOOL	1=Indicates a low voltage on power supply V2
NRing_Full	BOOL	1=Indicates that an N-Ring connection is completely broken.
NRing_Part_Low	BOOL	1=Indicates that an N-Ring connection is only broken in one direction. The lower N-Ring port is not receiving self health frames around the N-Ring but the higher N-Ring port is.
NRing_Part_High	BOOL	1=Indicates that an N-Ring connection is only broken in one direction. The higher N-Ring port is not receiving self health frames around the N-Ring but the lower N-Ring port is.
NRing_Multiple_Managers	BOOL	1=Indicates that more than one N-Ring Manager exists on an N-Ring.
System	BOOL	1=Indicates a system fault.
Config_Device	BOOL	1=Indicates a problem with the configuration device.
NLink	BOOL	1=Indicates that the N-Link Master or Slave encountered a problem.
Boot_Loader_Version	BOOL	1=Indicates a problem with the version of the boot loader firmware.
Port_Utilization	BOOL	1=Indicates one or more ports have exceeded a high or low bandwidth utilization limit.
Temperature	BOOL	1=Indicates the switch temperature has exceeded a high or low temperature limit.

4.4 CIP Tags

There are tags for each CIP object. The tags correspond to the object's attributes.

- Identity object
- TCP/IP Interface object
- Ethernet Link object
- N-TRON switch object

4.5 Identity object

Data Type: UDT_NTRON_CIP_Identity_v0

Name	Data Type	Description
Vendor_ID	INT	ODVA Vendor ID. N-Tron = 1006
Device_Type	INT	0x0C. Communications Adapter
Product_Code	INT	708TX=701, 708FX2=703, 716TX=705, 716FX2=706, 7018TX=708, 7018FX2=709, 708M12=710, 711FX3=711, 7010TX=713, 709FX=714, 710FX2=715, 714FX6=717, 712FX4=718, 7506GX2=7506
Major_Revision	SINT	Major revision of the item the Identity Object represents
Minor_Revision	SINT	Minor revision of the item the Identity Object represents
Status	INT	Summary status of device
Serial_Number	DINT	Serial number of device
Product_Name	STRING	Human readable identification. Switch model number. Ex: N-TRON 7018FX2
Assigned_Name	UDT_NTRON_String1024	User assigned switch name.
Geographic_Location	UDT_NTRON_String1024	This is the user assigned switch location.

4.6 TCPIP object

Data Type: UDT_NTRON_CIP_TCPIP_Interface_v0

Name	Data Type	Description
Status	DINT	Interface status
Configuration_Capability	DINT	Interface capability flags
Configuration_Control	DINT	Interface control flags

Path_Size	INT	Size of Path
Object_Path_1	INT	Logical segments identifying the physical link object
Object_Path_2	INT	Logical segments identifying the physical link object
IP_Address	DINT	The device's IP address.
Network_Mask	DINT	The device's network mask
Gateway_Address	DINT	Default gateway address
Name_Server_1	DINT	Primary name server
Name_Server_2	DINT	Secondary name server
Domain_Name	STRING	Default domain name
Host_Name	STRING	Host name

4.7 Ethernet Link object

Data Type: UDT_NTRON_CIP_Ethernet_Link_v0

Name	Data Type	Description
Interface_Speed	DINT	Interface speed currently in use. Speed in Mbps (e.g., 0, 10, 100, 1000, etc.)
Interface_Flags	UDT_NTRON_CIP_Interface_Flags_v0	Interface status flags
Physical_Address	SINT[6]	MAC layer address
InOctets	DINT	Octets received on the interface
InUcastPackets	DINT	Unicast packets received on the interface
InNucastPackets	DINT	Non-unicast packets received on the interface
InDiscards	DINT	Inbound packets received on the interface but discarded
InErrors	DINT	Inbound packets that contain errors (does not include In Discards)
InUnknownProtos	DINT	Inbound packets with unknown protocol
OutOctets	DINT	Octets sent on the interface
OutUcastPackets	DINT	Unicast packets sent on the interface
OutNucastPackets	DINT	Non-unicast packets sent on the interface
OutDiscards	DINT	Outbound packets discarded

OutErrors	DINT	Outbound packets that contain errors
Alignment_Errors	DINT	Frames received that are not an integral number of octets in length
FCS_Errors	DINT	Frames received that do not pass the FCS check
Single_Collisions	DINT	Successfully transmitted frames which experienced exactly one collision
Multiple_Collisions	DINT	Successfully transmitted frames which experienced more than one collision
SQE_Test_Errors	DINT	Number of times SQE test error message is generated
Deferred_Transmissions	DINT	Frames for which first transmission attempt is delayed because the medium is busy
Late_Collisions	DINT	Number of times a collision is detected later than 512 bit- times into the transmission of a packet
Excessive_Collisions	DINT	Frames for which transmission fails due to excessive collisions
MAC_Transmit_Errors	DINT	Frames for which transmission fails due to an internal MAC sub layer transmit error
Carrier_Sense_Errors	DINT	Times that the carrier sense condition was lost or never asserted when attempting to transmit a frame
Frame_Too_Long	DINT	Frames received that exceed the maximum permitted frame size
MAC_Receive_Errors	DINT	Frames for which reception on an interface fails due to an internal MAC sub layer receive error
Control_Bits	INT	0 Auto-negotiate 0 indicates 802.3 link auto-negotiation is disabled. 1 indicates auto-negotiation is enabled. If auto-negotiation is disabled, then the device shall use the settings indicated by the Forced Duplex Mode and Forced Interface Speed bits; 1 Forced Duplex Mode If the Auto-negotiate bit is 0, the Forced Duplex Mode bit indicates whether the interface shall operate in full or half duplex mode. 0 indicates the interface duplex should be half duplex. 1 indicates the interface duplex
Forced_Interface_Speed	INT	Speed at which the interface shall be forced to operate. Speed in Mbps (10, 100, 1000, etc.)
Interface_Type	SINT	0-unknown, 1-internal, 2-twisted pair, 3-optical

Interface_State	SINT	0-unknown, 1-enabled and ready, 2-disabled, 3-testing
Admin_State	SINT	1=enabled, 0=disabled
Interface_Label	STRING	Label like "TX5"
Interface_Description	STRING	Something like: Port 1 - 10/100 Mbit TX Port 15 - 100 MBit FX
Interface_Utilization	SINT	Percentage of entire interface bandwidth being used (0-100)
Utilization_Alarm_Upper_Threshold	SINT	Upper percentage at which to declare a utilization alarm (0-100).
Utilization_Alarm_Lower_Threshold	SINT	Lower percentage at which to declare a utilization alarm (0-100).
Broadcast_Limit	SINT	Broadcast limiting percentage (0-100). (BPCL)
TX_Unicast_Packet_Rate	DINT	Number of TX unicast packets per second.
RX_Unicast_Packet_Rate	DINT	Number of RX unicast packets per second.
TX_Multicast_Packet_Rate	DINT	Number of TX multicast packets per second
RX_Multicast_Packet_Rate	DINT	Number of RX multicast packets per second
TX_Broadcast_Packet_Rate	DINT	Number of TX broadcast packets per second.
RX_Broadcast_Packet_Rate	DINT	Number of RX broadcast packets per second
TX_Multicast_Packets	DINT	Total number of TX multicast packets.
RX_Multicast_Packets	DINT	Total number of RX multicast packets.
TX_Broadcast_Packets	DINT	Total number of TX broadcast packets.
RX_Broadcast_Packets	DINT	Total number of RX broadcast packets.
Port_Role	DINT	Bit 0 = RSTP 1 = N-Ring 2 = N-Link Control 3 = N-Link Partner 4 = N-Link Coupler

4.8 N-TRON Switch object

Data Type: UDT_NTRON_CIP_Switch_v0

Name	Data Type	Description
Device_Uptime	DINT	Number of seconds since device was powered up.
Port_Count	DINT	Total port count
Valid_Ports	DINT[2]	0 = Invalid port, 1 = Port exists on device Bit 0: Port 1 Bit 1: Port 2 etc.

Global_Admin_Status	DINT[2]	0 = Port disabled, 1 = Port enabled Bit n: Port n+1
Global_Link_Status	DINT[2]	0 = Link down, 1 = Link up Bit n: Port n+1
System_Faults	UDT_NTRON_System_Faults_v0	Bit 00: Power Supply 1 Bit 01: Power Supply 2 Bit 02: N-Ring Fault (complete) Bit 03: N-Ring Partial Fault (low port) Bit 04: N-Ring Partial Fault (high port) Bit 05: N-Ring Multiple Managers Bit 06: System error Bit 07: Dongle Configuration Invalid Bit 08: N-Link Fault Bit 09: Boot loader version mismatch Bit 10: Port Utilization Alarm Bit 11: Temperature Alarm
IGMP_Querier_Status	SINT	Query Status: 0 = Disabled, 1 = Active (manual), 2 = Active (Auto), 3 = Backup (Auto) [enabled but not active].
IGMP_Version	SINT	IGMP Version (V1, V2, V3, etc).
IGMP_Resource_Usage	SINT	Percent of maximum capacity. Takes into account the number of groups used per max groups and any other possible resource limitations.
IGMP_Active_Querier	DINT	IP of the active IGMP querier.
CPU_Usage	SINT	Percent usage
Class1_Connections	INT	Number of CIP Ethernet/IP class 1 (multicast) connections.
Class3_Connections	INT	Number of CIP Ethernet/IP class 3 (unicast) connections.
Temperature_Alarm_Upper_Threshold	INT	Upper temperature (C) at which to declare an alarm
Temperature_Alarm_Lower_Threshold	INT	Lower temperature (C) at which to declare an alarm
Contact_Status	SINT	2 Bits per contact. 00=Not Present, 01=Open, 10=Closed.
Temperature_C	INT	Temperature in degrees C. Only available on devices that support temperature.
Temperature_F	INT	Temperature in degrees F. Only available on devices that support temperature.
Reset_MIB_Counts	DINT[2]	Reset port MIB counters. (1 bit per port to reset).
Device_MAC_Address	SINT[6]	MAC address of device
Device_Role	DINT	Bit mask of device roles. Bits= 0 = N-Ring Manager 1 = N-Ring Member 2 = N-Ring AutoDetect 3 = N-Link Master 4 = N-Link Slave 5 = N-Link Coupler
Config_Device_Status	SINT	0 = Not Supported, 1 = Not Present, 2 = Present
System_Configuration	DINT	Bit mask of system config. Bits= 0 = Save system configuration to flash 1 = Shutdown and reboot device

System_Firmware_Version_String	STRING	Human readable representation of firmware version string.
System_Boot_Loader_Version_String	STRING	Human readable representation of boot loader version string.
System_Fault_String	UDT_NTRON_String1024	Human readable representation of error status. May contain multiple errors. Length is contained as part of the STRINGI data type.

5 Rockwell FactoryTalk - Faceplate Installation Instructions

N-TRON 700-Series Switch
FactoryTalk View ME/SE Faceplate Displays

Software installation prerequisites

3. FactoryTalk View Studio – ME/SE version 5 or later
4. N-TRON switch with firmware version 3 or later

Summary of Faceplate installation steps

1. create shortcut to PLC
2. add global objects to your project
3. add local messages
4. add images
5. import HMI tags
6. create faceplate display
7. configure display startup macro
8. configure display parameter file
9. optionally add composite switch image to display
10. optionally add specific switch image to display

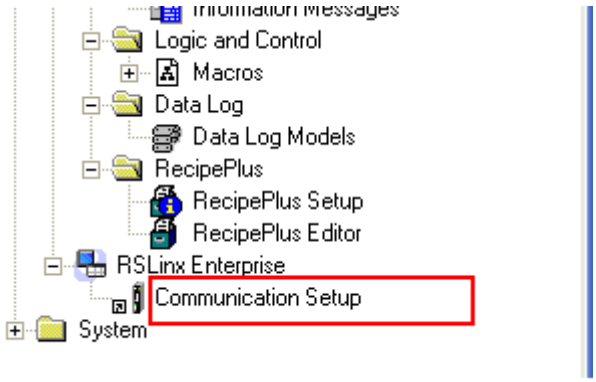
In the instructions below, “ME” refers to FactoryTalk View ME (Machine Edition) and “SE” refers to FactoryTalk View SE (Site Edition).

5.1 Configuration of FactoryTalk View Faceplate Displays

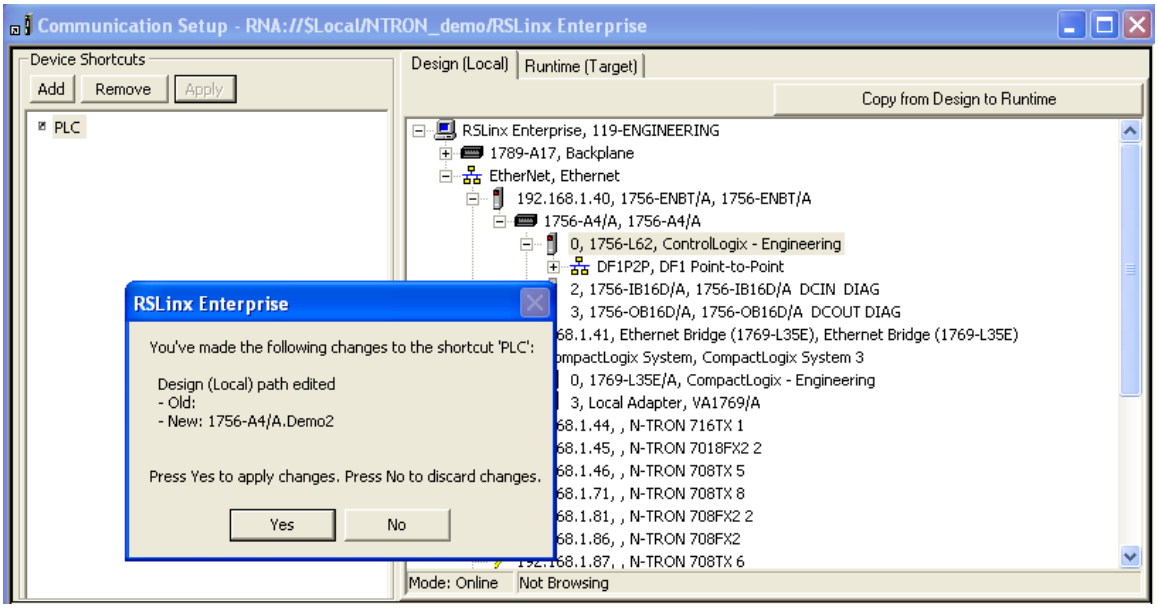
Extract all files from the zip file to your desktop or some other folder.

Start with an existing FactoryTalk View ME/SE application.

1. Configure a shortcut to the PLC that is running the NTRON AOI. Double click Communications Setup.

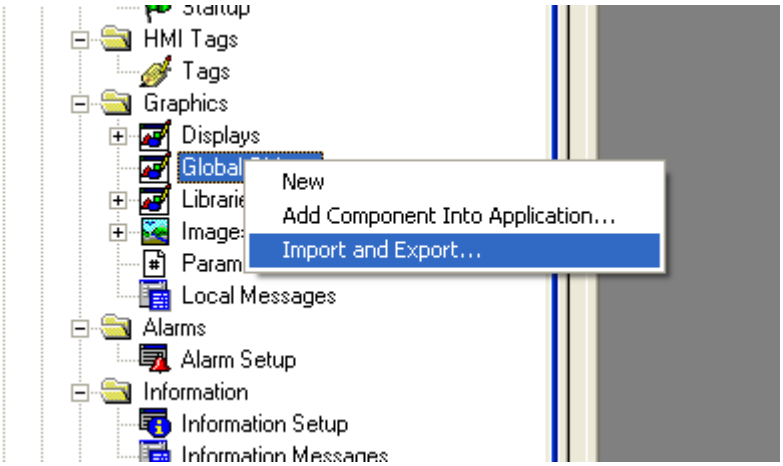


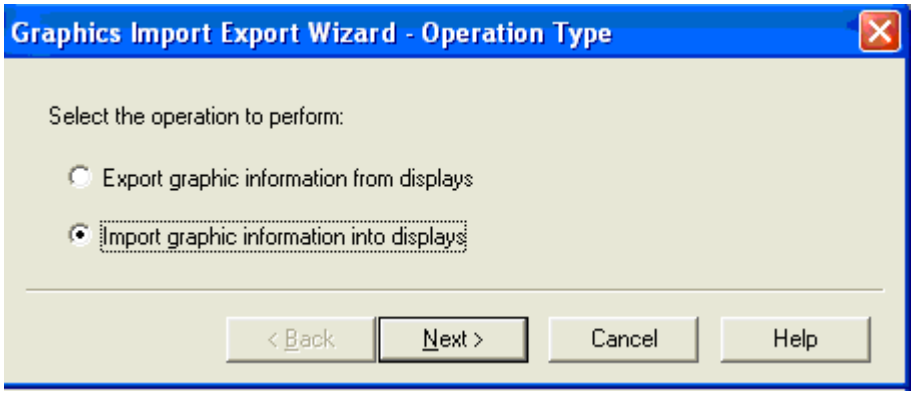
In the screenshot following, the shortcut is named PLC.

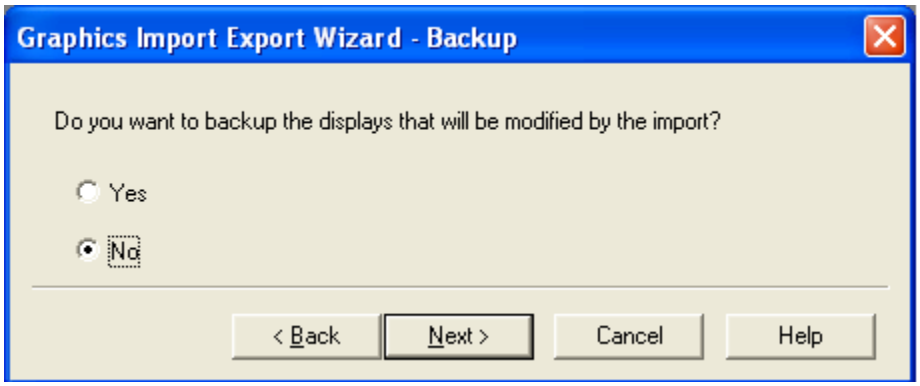


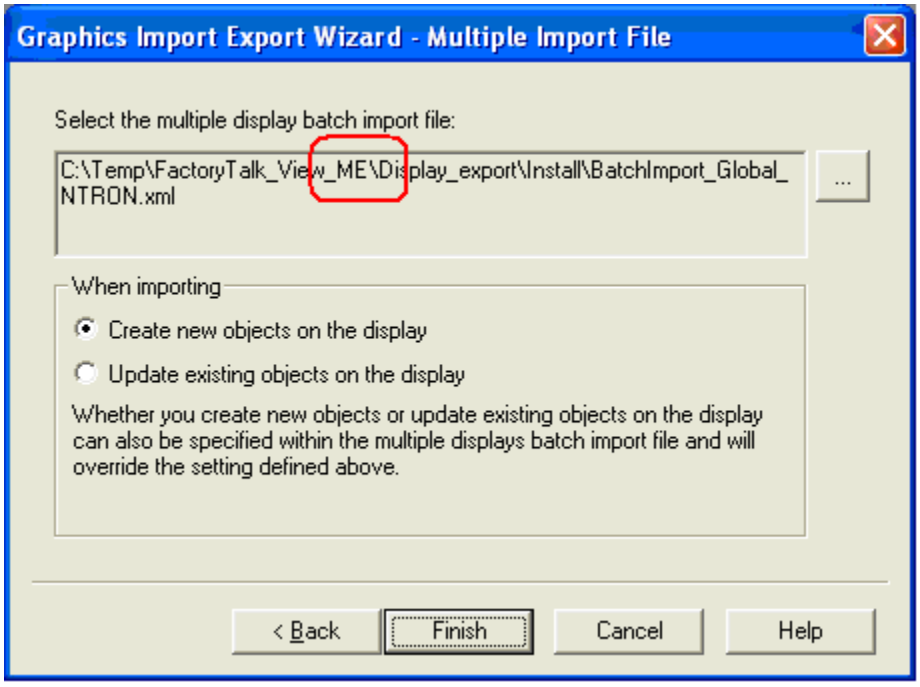
Click the “Yes” button and if ME, click the “Copy from Design to Runtime” button.

2. Import graphics





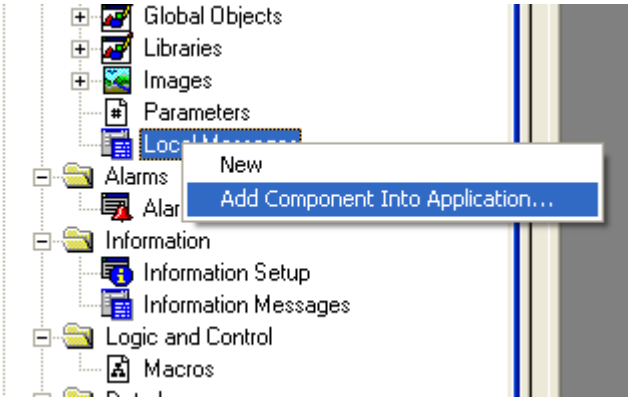




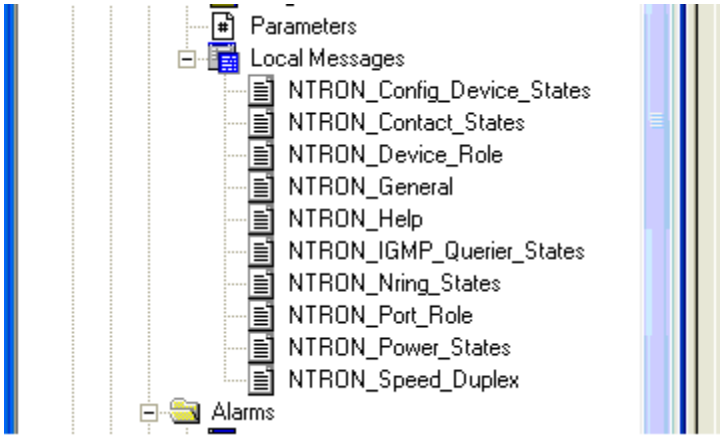
For SE, use the FactoryTalk_View_SE folder in the above dialog.

These global objects should appear in the Explorer window:

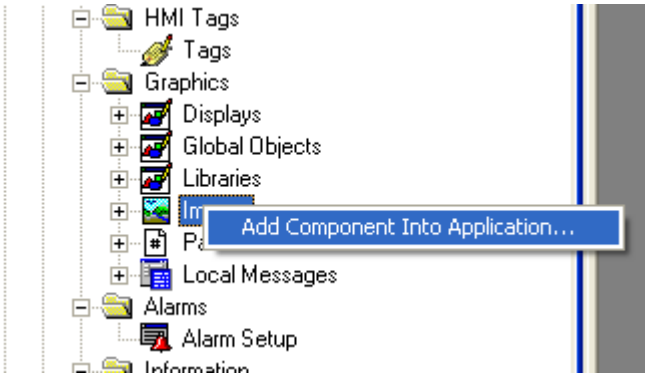
3. Import local messages



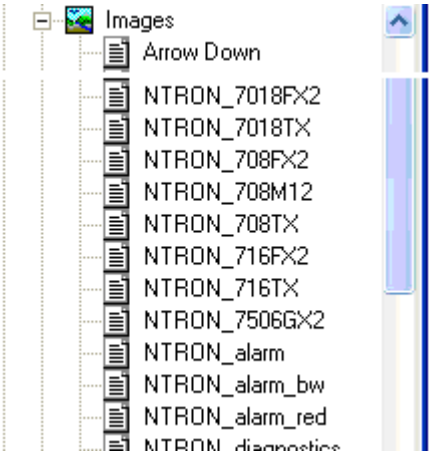
Select the folder (FactoryTalk_View_ME\Display_export\Install\local) containing the local message files (.loc). Import all NTRON*.loc files. The Explorer window should show these files:



4. Import images.



Select the folder (FactoryTalk_View_ME\Display_export\Install\images) containing the image files (.bmp). Import all NTRON*.bmp files. The Explorer window should show several new files:

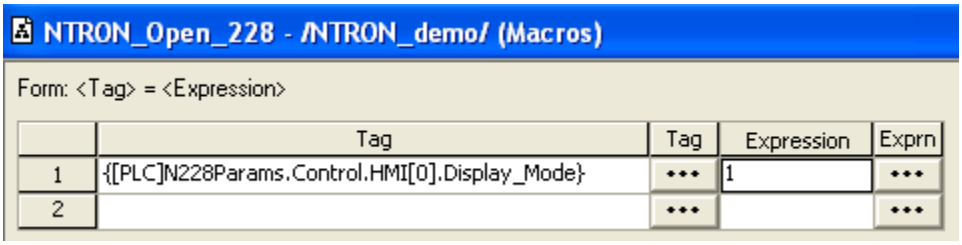


5. Import tags using the Tag Import and Export Wizard. Select the NTRON-Tags.CSV to import (FactoryTalk_View_ME\Display_export\Install\tags). The result should be these tags:

	Tag Name	Type	Description
1	NTRON_Help	Digital	
2	NTRON_Settings_Selection	Analog	
3	NTRON_Trend_Selection	Analog	
4			

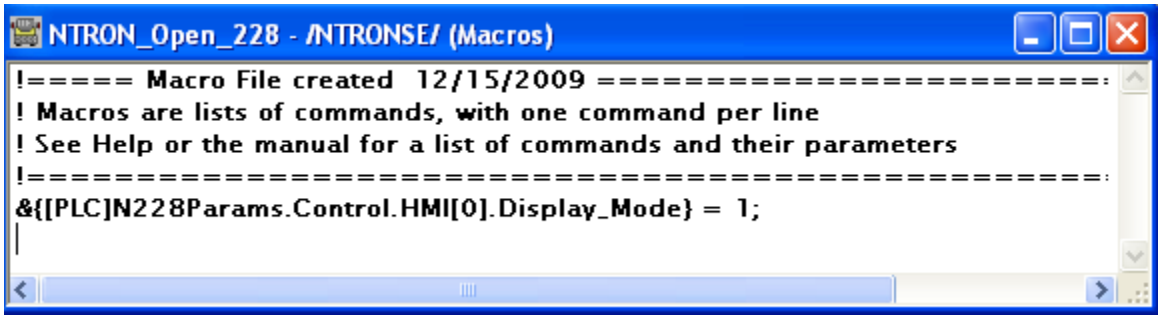
6. To access the faceplate displays, create a display using the global object NTRON_Display. (File > New > Display. Select all objects in the NTRON_Display global object and paste them into the new display. Save the new display.)

Configure a macro for opening your display. Here is the ME form for this example:



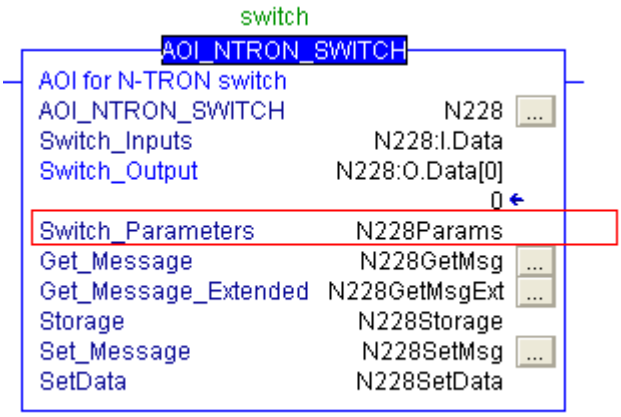
Tag from screenshot: {[PLC]N228Params.Control.HMI[0].Display_Mode}

Here is the SE form:

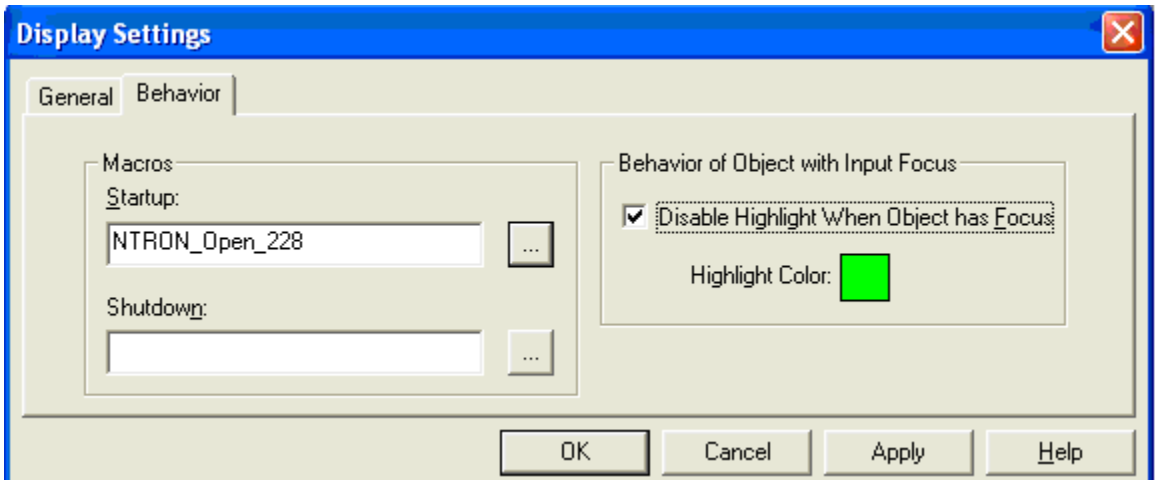


Tag from screenshot: &{[PLC]N228Params.Control.HMI[0].Display_Mode} = 1;

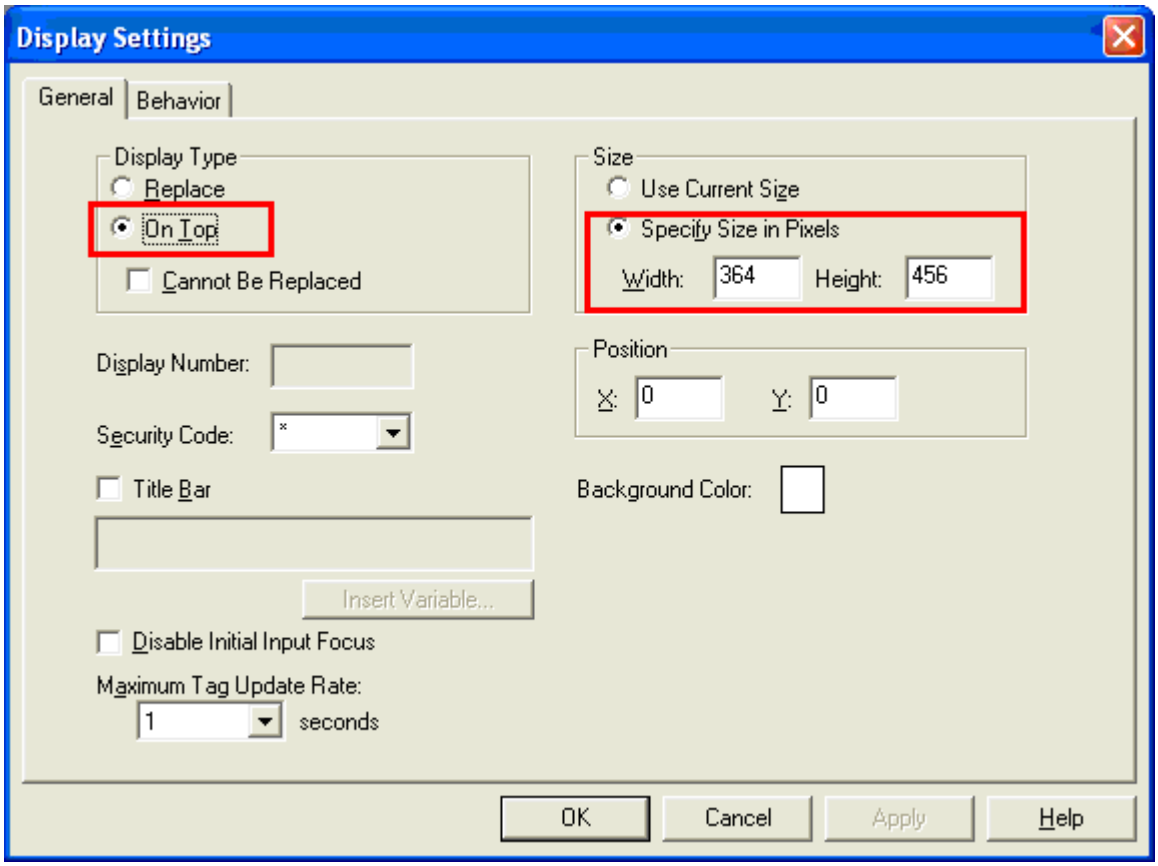
In the macro definition (and later in the parameter file), the shortcut "PLC" was created earlier. The other important piece is "N228Params", which is the name of the Switch_Parameters tag created for the NTRON_SWITCH AOI in your RSLogix project. Example:



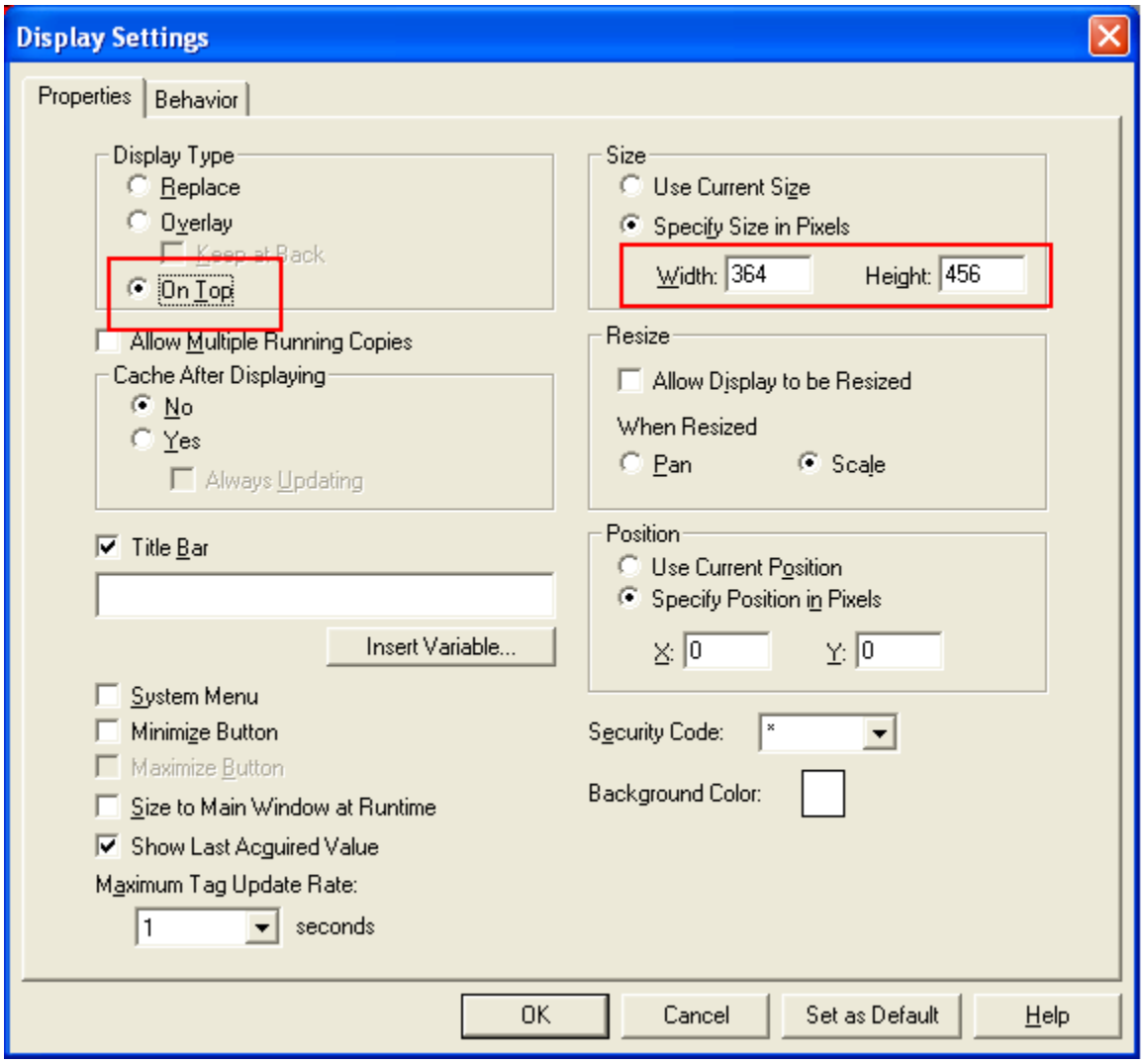
In the Display Settings for the NTRON_Display (open the NTRON_Display display, Edit > Display Settings) click the Behavior panel and assign the newly created macro as the startup macro.



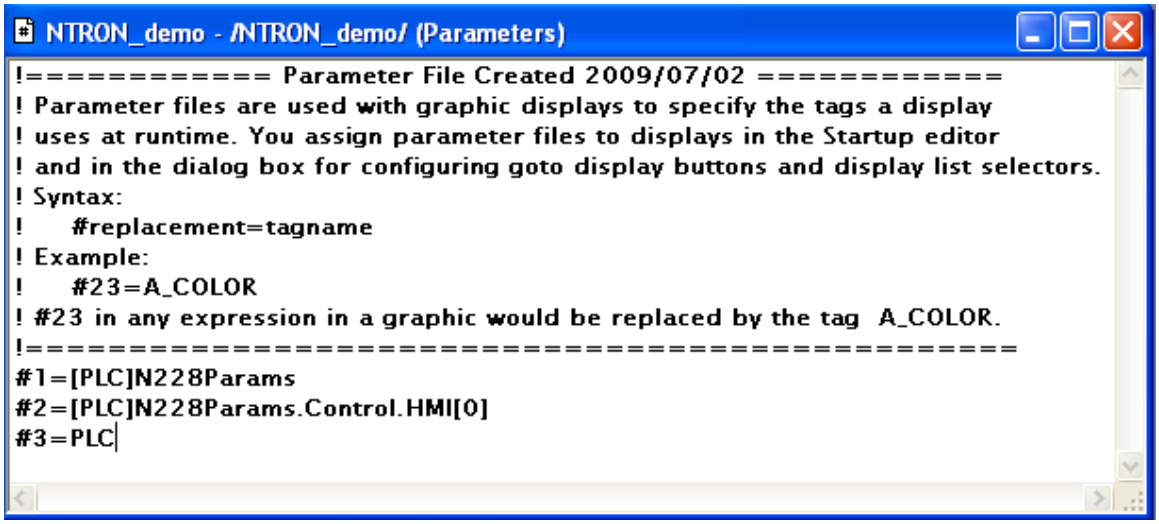
8. Click the General tab and change Display Type and Size. Here is the ME form:



Here is the SE form:

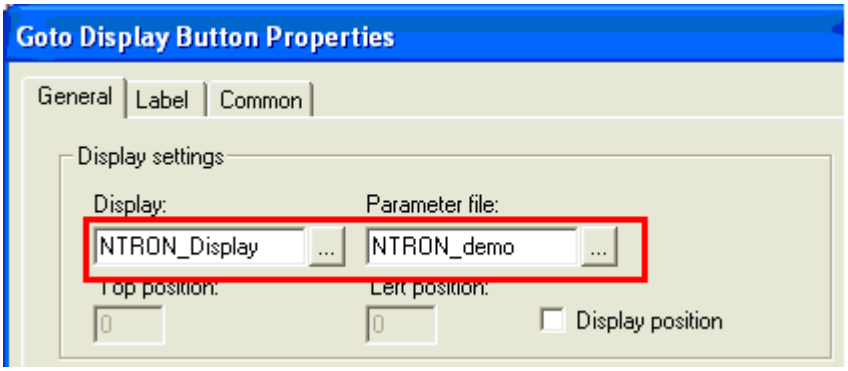


On the display where you wish to show the faceplate, create a Goto Display button. Create a parameter file that will be associated with the button.

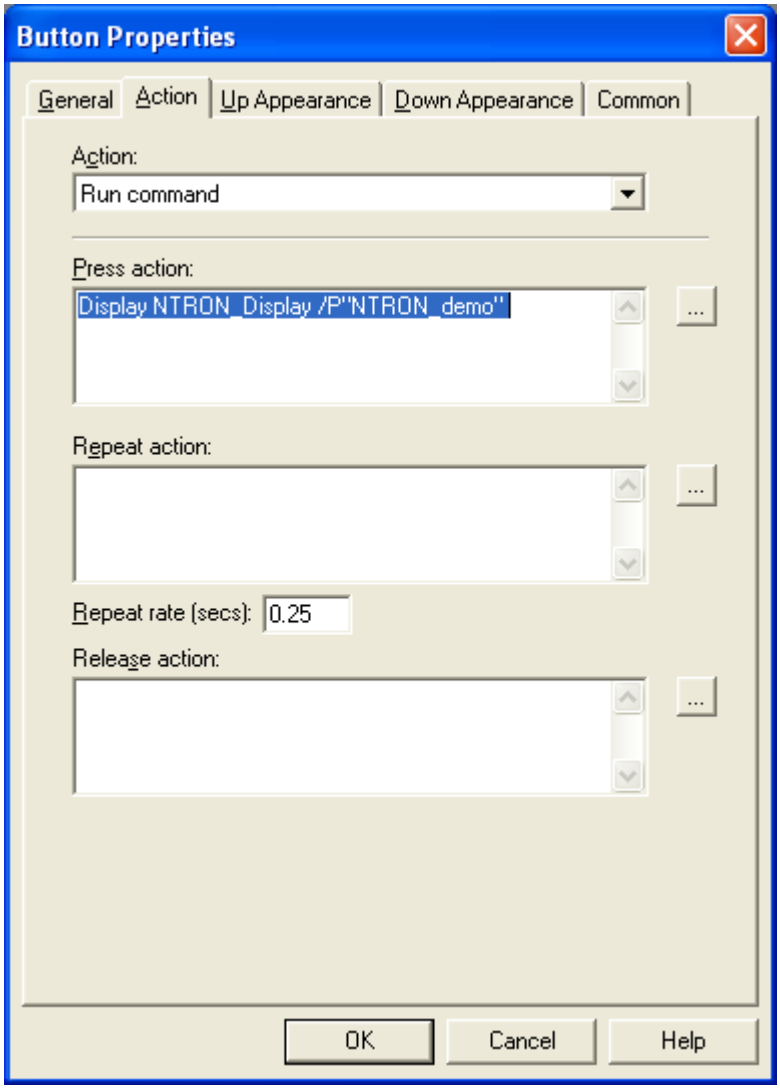


Substitute your shortcut for “PLC” and the name of your Switch_Parameters for N228Params, in the parameter file.

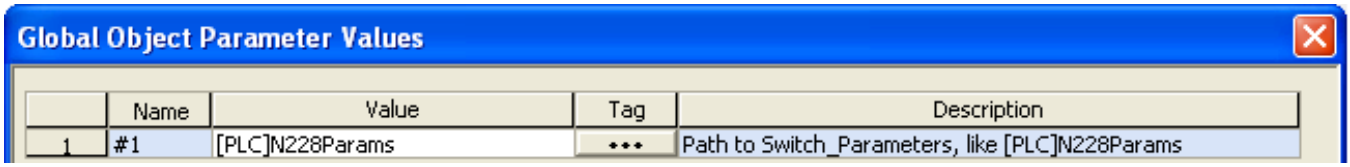
Assign a display and parameter file to the Goto Display button. Here is the ME form:



Here is the SE form:



You can also display an image of an NTRON switch using the global object NTRON_graphic. When used, define Global Object Parameter #1 as follows:

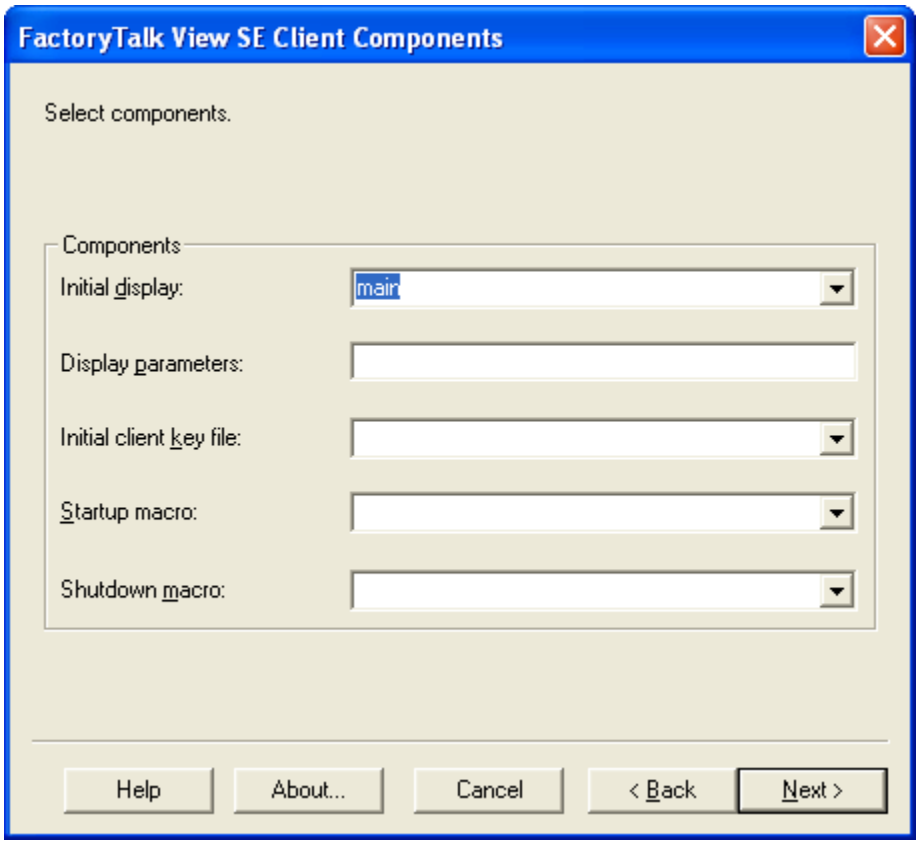


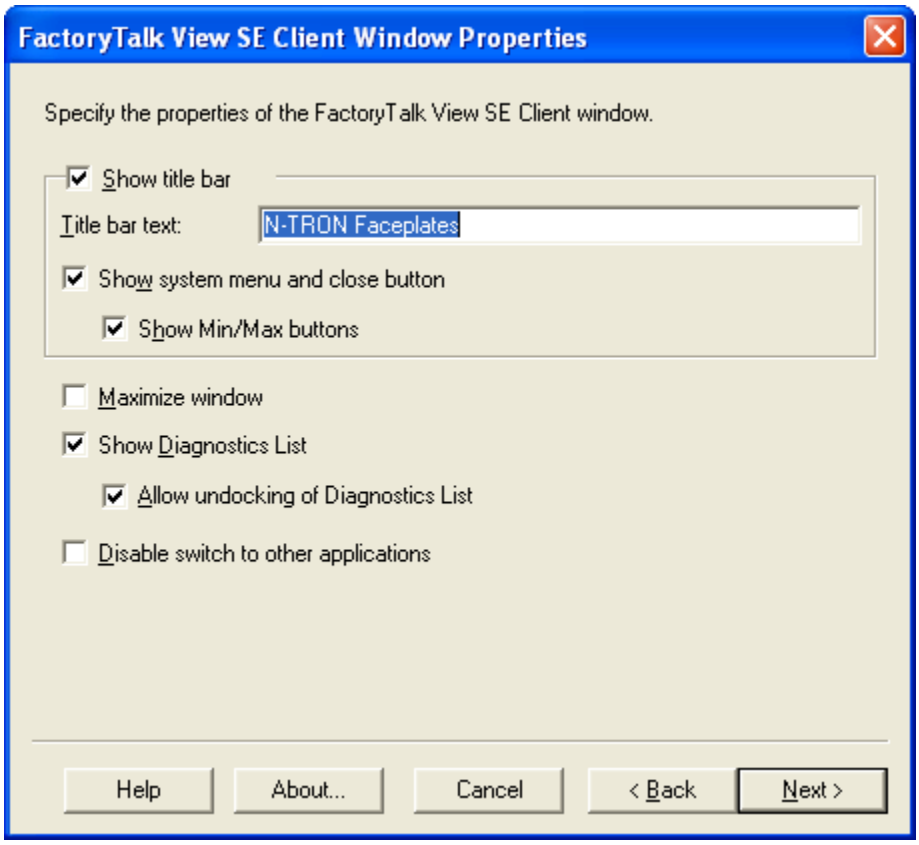
The NTRON_graphic global object is a composite of several N-TRON switches. Due to the number of switches, and the tags used for each switch, you may run into the limit for maximum tags allowed on a display.

To work around this limitation, use individual global objects for each switch. These are imported by using the BatchImport_Global_NTRON_Switches.xml import file. The global object names contain the switch name, such as NTRON_708TX. Setup Global Object Parameter #1 as described for the NTRON_graphic object.

For more information on the displays, including screenshots, see the Faceplate Quick Reference.

FactoryTalk View SE Client setup:





5.2 Sample Project

Refer to the ME or SE sample project archive named NTRON_demo.apa.

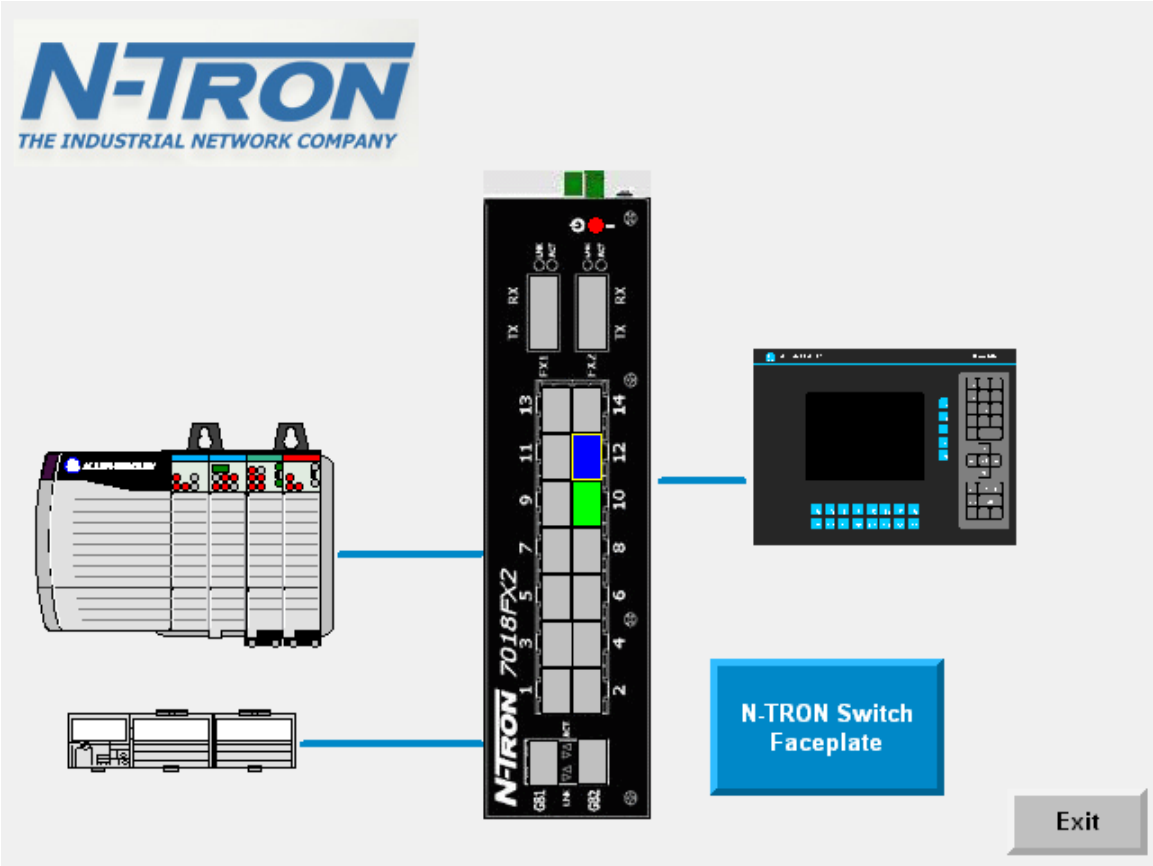
If you have any suggestions for improving the faceplates or the installation instructions, please send them to N-TRON_Support@n-tron.com with subject “FactoryTalk Faceplates”.

6 Rockwell FactoryTalk - Faceplate quick reference guide

6.1 Introduction

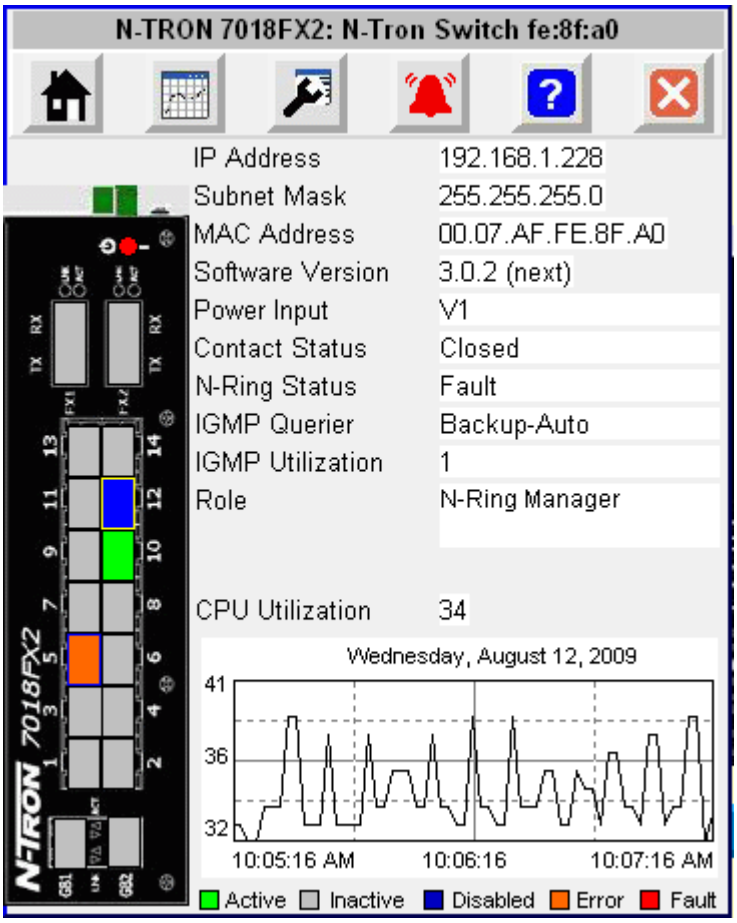
The Faceplates consists of several displays: Home, Diagnostics, Settings, and Alarm. Click the buttons at the top of the screen to navigate between the displays. The “?” button is used to toggle the display of help text, and the “X” button is used to exit the Faceplates.

The caption at the top includes the switch product name and the user assigned switch name, separated by a colon.



6.2 Home display

This home display shows general switch information. The trend shows CPU utilization.



Some fields show simple values, such as IP Address. Others, such as Device Role, show values that depend on the switch configuration.

The following table describes fields and values.

Field	Values	Description
IP Address	Like 192.168.1.201	Switch IP address
Subnet Mask	Like 255.255.255.0	Switch subnet mask
MAC Address	Like 00:07:AF:FE:8F:A0	MAC address of switch
Software Version	Like 3.0.2	Software version of switch
Power Input	V1 V2 V1 and V2 Unknown AC/DC Power	V1 – Power Supply 1 V2 – Power Supply 2
Contact Status	Not Supported Open	The status of the contact on the switch.

	Closed	
N-Ring Status	Fault Partial-Low Partial-High Multiple-Managers OK N/A (if N-Ring auto-member, or N-Ring disabled) Unknown (if N-Ring member)	The N-Ring status, if the switch is configured as an N-Ring manager.
IGMP Querier	Disabled Active-Manual Active-Auto Backup-Auto Unknown	Internet Group Management Protocol Querier status
IGMP Utilization	0-100 percent	Internet Group Management Protocol Utilization
Config Device	Not Supported Not Present Present Unknown	This field is displayed for switches that support a configuration device.
Role	N-Ring Manager N-Ring Member N-Ring AutoMember N-Link Master N-Ring Mem, N-Link Master N-Ring Auto, N-Link Master N-Link Slave N-Ring Mem, N-Link Slave N-Ring Auto, N-Link Slave N-Link Coupler N-Ring Mem, N-Link Coupler N-Ring Auto, N-Link Coupler Unknown	The role of the switch, which is based on the switch configuration.
CPU Utilization	0-100 percent	CPU utilization percentage
CPU Trend	0-100 percent	Trend of CPU utilization

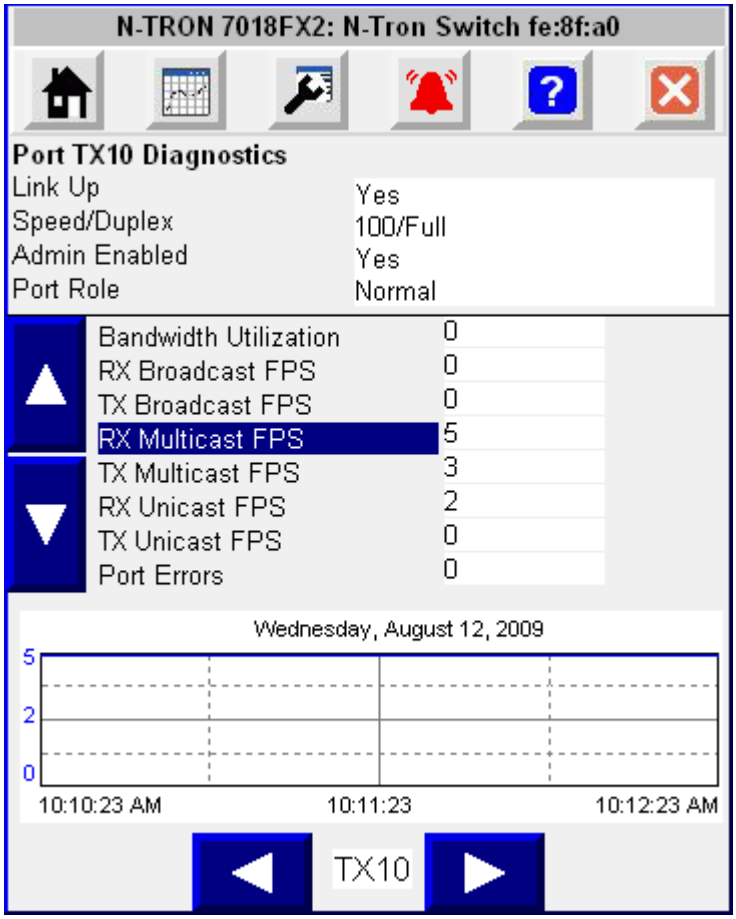
On the switch image, the color of each port changes based on the port state.

Port Color	**Port State**
Active	The port is active
Inactive	The port is inactive
Disabled	The port is administratively disabled
Error	A port utilization limit, high or low, has been exceeded

The LED at the top of the switch graphic will be green if there are no faults, red if a fault has occurred. You can view faults on the alarms display.

6.3 Diagnostics display

The diagnostics display shows information for a selected switch port. Use the buttons at the bottom to select a switch port and use the buttons at the left to select a port variable to trend. The highlighted variable is trended at the bottom.



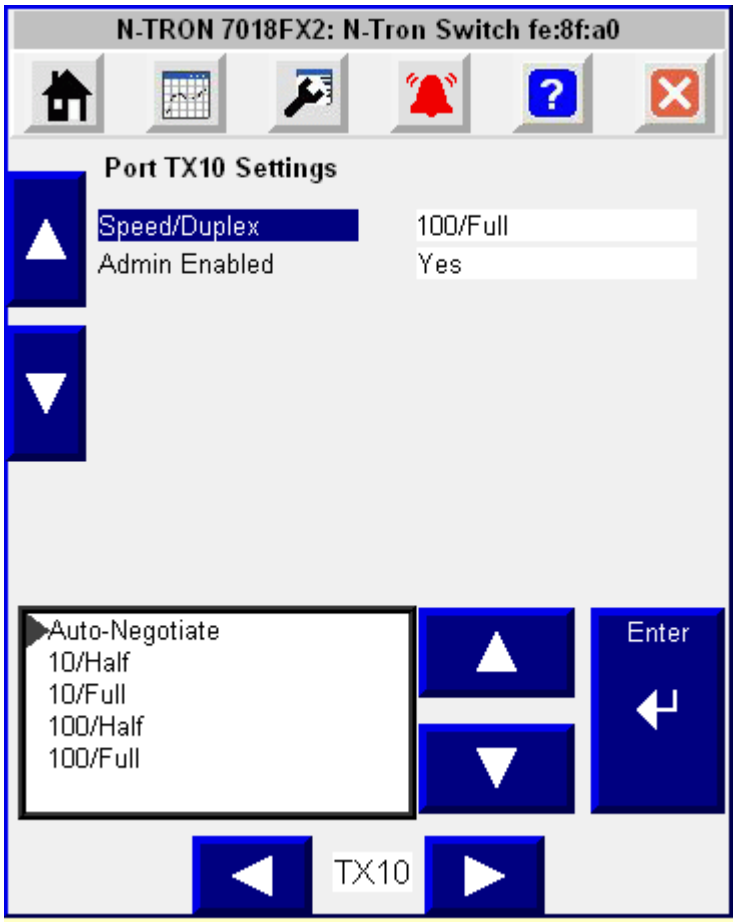
The following table describes fields and values.

Field	Values	Description
Link Up	Yes No	Current link state
Speed/Duplex	10/Full 100/Full 1000/Full 10/Half 100/Half 1000/Half Unknown	This configurable field displays the current speed and mode of the port
Admin Enabled	Yes No	This configurable field displays the existing status of the port whether it is Enabled/Disabled.

Port Role	RSTP N-Ring N-Link Control N-Link Partner RSTP, NLink Partner NRing, NLink Partner N-Link Coupler RSTP, NLink Coupler	The role of the port, which is based on the switch configuration
Bandwidth Utilization	0-100 percent	Bandwidth utilization displayed as a percentage
RX Broadcast FPS		The frames per second rate of received broadcast frames.
TX Broadcast FPS		The frames per second rate of transmitted broadcast frames.
RX Multicast FPS		The frames per second rate of received multicast frames
TX Multicast FPS		The frames per second rate of transmitted multicast frames
RX Unicast FPS		The frames per second rate of received unicast frames
TX Unicast FPS		The frames per second rate of transmitted unicast frames
Port Errors		The sum of alignment errors, FCS errors, SQE Test errors, excessive collisions, MAC transmit errors, carrier sense errors, frame too long, and MAC receive errors.

6.4 Settings display

The settings display allows some switch port related settings to be changed.
Use the buttons at the bottom to select a switch port and use the buttons at the left to select a port setting to change. Use the wide up/down buttons toward the bottom to select a value, and the Enter button to accept the change.

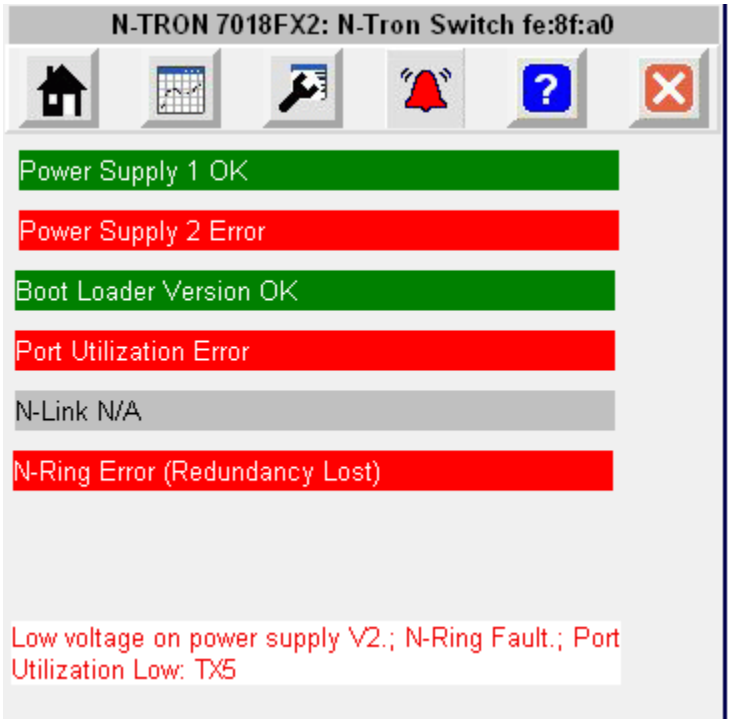


The following table describes fields and values.

Field	Value	Description
Speed/Duplex	10/Full 100/Full 1000/Full 10/Half 100/Half 1000/Half Unknown	This configurable field displays the current speed and mode of the port
Admin Enabled	Yes No	This configurable field displays the existing status of the port whether it is Enabled/Disabled.

6.5 Alarm display

The alarm display shows the status of several alarms. Alarms with a grey background and an “N/A” suffix do not apply for the switch type, or for the current configuration of the switch.



Values ending with “OK” will be green, with “Error” will be red, and with “N/A” will be gray.

The following table describes fields and values.

Field	Values	Description
Power Supply 1	Power Supply 1 OK Power Supply 1 Error	V1
Power Supply 2	Power Supply 2 OK Power Supply 2 Error	V2
Boot Loader Version	Boot Loader Version OK Boot Loader Version Error	
Port Utilization	Port Utilization OK Port Utilization Error	Shows error if utilization limits on any port is exceeded
N-Link	N-Link OK N-Link Error N-Link N/A	Shows N/A if not configured for N-Link
N-Ring	N-Ring Error (Redundancy Lost) N-Ring Error (Partial Low) N-Ring Error (Partial High) N-Ring Error (Multiple Managers) N-Ring Error (Redundancy Lost, Mult Mgrs)	Shows N/A if not configured for N-Ring

	N-Ring Error (Partial Low, Mult Mgrs) N-Ring Error (Partial High, Mult Mgrs) N-Ring OK N-Ring N/A	
Configuration Device	Configuration Device OK Configuration Device Error Configuration Device N/A	This field is displayed if the switch supports a configuration device
Temperature	Temperature OK Temperature Error Temperature N/A	This field is displayed if the switch supports a temperature sensor

The system fault string is shown at the bottom of the display

7 Support

Contact Information:

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FAX: (251) 342-6353
WEBSITE: www.n-tron.com
E-MAIL: N-TRON_Support@n-tron.com

8 References

[1] The CIP Networks Library, Volume 1: Common Industrial Protocol (CIP™), Edition 3.5, Publication Number: PUB00001, Open DeviceNet Vendor Association, Inc., 4220 Varsity Drive, Suite A, Ann Arbor, MI 48108-5006 USA

[2] The CIP Networks Library, Volume 2: EtherNet/IP Adaptation of CIP, Edition 1.6, Publication Number: PUB00002, Open DeviceNet Vendor Association, Inc., 4220 Varsity Drive, Suite A, Ann Arbor, MI 48108-5006 USA

9 Revisions

Revision	Description
April-8-2010	Added switches: 711FX3, 7010TX, 709FX, 710FX2, 714FX6, and 712FX4
September 2010	Added 7012FX2 switch
January 2011	Added 7026TX switch